SENATOR II

# ANALOGUE ADDRESSABLE FIRE DETECTION AND ALARM SYSTEM

# Installation Manual

**Version 3.3X**

**78910-03NM Issue 2**

**October 1996**

Notes to Installer

EMC Compliance and LVD Compliance

Cables

Loop Circuit Connections

Standalone System Installation

Network overview

Network System Installation

Parts

# Preface

This is the second issue of the Installation Manual for the **Senator II** system. The manual covers Senator II products that are compatible with version 3.3X software and also includes the requirements of the Low Voltage Directive**.**

The manual is a guide to be read in conjunction with the recommendations in *BS5839:Part 1:1988,* which is the *code of practice for Fire detection and alarm system for buildings.*

# Associated Documents

78930-03NM Operating Manual for Senator II

# Conventions

***NOTE:*** *A note highlights important text that is normally hidden in the main text.*

***CAUTION:*** *A caution is given to prevent damage to equipment.*

***WARNING:*** *A warning is given to of dangerous conditions that may result in injury or death.*

| Issue Record | | | |
|---|---|---|---|
| Section | Issue | Date | Comments |
| Prelims<br>1 - 21<br>Parts | 2<br>2<br>2 | 10/96<br>10/96<br>10/96 | This second issue covers installation of Senator II systems and network system products that are compatible with version 3.3X software. The second issue also covers changes arising from LVD requirements. |

The information contained herein is the property of CARADON GENT LIMITED and is supplied without liability for errors or omissions. No part of the manual may be reproduced in any form whatsoever without prior consent of the company. Due to the on going development of the Senator II system the information contained in the manual is subject to change without notice.

This page left intentionally blank

# Senator II Supplier Details

For any queries please contact your supplier, whose details are shown below:

Supplier name:_____

Address:_____

_____

_____

Telephone number:_____

Fax number:_____

This page left intentionally blank

# List of Contents

**Notes to Installer . . . . . 1-1**

**EMC Compliance . . . . . 2-1**

**LVD Compliance . . . . . 3-1**

**Cable Types . . . . . 4-1**

**Loop cables . . . . . 4-1**

Loop Cable type and Specification . . . . . 4-1

Alternative Loop cable . . . . . 4-2

**Network Cables . . . . . 4-2**

**Loop Circuit Connections . . . . . 5-1**

**Loop Capacity . . . . . 5-1**

Devices (Outstations) per loop . . . . . 5-1

**Loop cable . . . . . 5-2**

**Cable separation . . . . . 5-2**

**Loop Coverage . . . . . 5-2**

**Spur circuits . . . . . 5-2**

**Lightning protection . . . . . 5-2**

**Control Panel connections . . . . . 5-4**

**2-way device . . . . . 5-5**

**3-way device . . . . . 5-5**

**Slave (Indicator) LED Unit . . . . . 5-6**

**SlaveRelay Unit . . . . . 5-6**

**Standalone System Installation . . . . . 6-1**

**78500-02NM Fire Alarm Control Panel Set . . . . . 6-1**

78500-82NM Fire Alarm Control Panel . . . . . 6-1

**Fuses and locations . . . . . 6-1**

**.78510-02NM Battery Unit . . . . . 6-5**

**Fuses and locations . . . . . 6-5**

**Fire Control Panel Connections . . . . . 6-7**

Mains Connection . . . . . 6-7

Loop, Master Alarms and Fire/Fault Relay Connections . . . . . 6-7

**78600-01NM Fire Alarm Repeat Panel Set . . . . . 6-8**

78600-82NM Fire Alarm Repeat Panel . . . . . 6-8

**Fuses and locations . . . . . 6-8**

**Fire Repeat Panel Connections . . . . . 6-10**

**Flushing Fixing Panels . . . . . 6-11**

**78200-01NM Terminal Plate . . . . . 7-1**

**Terminal Plate installation . . . . . 7-1**

**Fire sensors . . . . . 8-1**

**Fitting a sensor head to terminal plate . . . . . 8-2**

**Removal of sensor head from terminal plate . . . . . 8-3**

**To assemble a sensor head . . . . . 8-5**

**78260-01NM Semi flush mounting kit . . . . . 9-1**

**T-breaker and slave units . . . . . 10-1**

**78260-01NM Duct Sensor . . . . . 11-1**

**Manual Call Points . . . . . 12-1**

**Surface Fixing . . . . . 12-1**

**Semi-Flush Fixing . . . . . 12-3**

**Testing . . . . . 12-3**

**Alarm Sounders . . . . . 13-1**

**78277-01NM Repeat Sounder . . . . . 13-2**

**78301-01NM Fire Alarm Interface Unit**

**(Mains powered) . . . . . 14-1**

**Fuses and locations . . . . . 14-1**

**78321-01NM Fire alarm interface unit**

**(Loop powered) . . . . . 15-1**

**Fuses and Locations . . . . . 15-1**

**78345-06NM Power Supply Unit . . . . . 16-1**

**Fuses and Locations . . . . . 16-1**

**78310-01NM Loop Powered Zone Module . . . . . 17-1**

**78315-01NM Single Channel Interface**

**(Loop Powered) . . . . . 18-1**

**Network Overview . . . . . 19-1**

**Network Capacity . . . . . 19-1**

**Network Cables . . . . . 19-1**

**Schematic Diagram . . . . . 19-1**

**Network Installation . . . . . 20-1**

**Fuses and Locations . . . . . 20-1**

**78520-01NM Network Interface . . . . . 20-1**

**Network Wiring . . . . . 21-1**

**78500 Control Panel to 78520 Network Interface . . . . . 21-1**

**78520 Network Interface to 78520 Network Interface . . . . . 21-2**

## Senator II . . . . . 22-3

**Introduction . . . . . 22-3**

**Control and indicating equipment . . . . . 22-3**

**Cards . . . . . 22-4**

**Sensors, terminal plate and Accessories . . . . . 22-4**

**Alarm sounders . . . . . 22-5**

**Manual call points (MCP) . . . . . 22-5**

**Interfaces . . . . . 22-5**

**Manuals & Accessories . . . . . 22-6**

# List of Figures

**Figure 2-1 Cable termination . . . . . 2-3**

**Figure 5-1 Typical fire alarm system . . . . . 5-3**

**Figure 5-2 Connections to the Control Panel . . . . . 5-4**

**Figure 5-3 Connecting a 2-way device . . . . . 5-5**

**Figure 5-4 Connecting a 3-way device . . . . . 5-5**

**Figure 5-5 Connecting a slave Indicator unit . . . . . 5-6**

**Figure 5-6 Connecting slave relay unit . . . . . 5-6**

**Figure 6-1 Control Panel with the door open . . . . . 6-2**

**Figure 6-2 Control Panel Back box shown without door 6-3**

**Figure 6-3 Connection of Battery cable assembly . . . 6-4**

**Figure 6-4 Close fitting the Panel and Battery Unit . . 6-5**

**Figure 6-5 Control Panel Mains connection details . . 6-7**

**Figure 6-6 Control Panel cable connection points . . . 6-7**

**Figure 6-7 Repeat Panel back box . . . . . 6-9**

**Figure 6-8 Repeat panel connection points . . . . . 6-10**

**Figure 6-9 Flush fixing the Control or Repeat Panel . . 6-11**

**Figure 7-1 78200-01NM Terminal Plate . . . . . 7-1**

**Figure 7-2 Fixing the terminal plate to a ceiling tile . . 7-2**

**Figure 7-3 Terminal Plate connections . . . . . 7-2**

**Figure 7-4 Wiring the terminal plate . . . . . 7-2**

**Figure 8-1 Fitting a sensor head to terminal plate . . . 8-2**

**Figure 8-2 Removal of the chamber module . . . . . 8-3**

**Figure 8-3 Removal of electronics from terminal plate 8-4**

**Figure 8-4 Fitting together chamber and electronics . 8-5**

**Figure 9-1 Cutouts for lugs . . . . . 9-1**

**Figure 9-2 Flush kit installation . . . . . 9-2**

**Figure 10-1 T-breaker and slave units . . . . . 10-1**

**Figure 10-2 Fitting a t-breaker or slave unit . . . . . 10-2**

**Figure 11-1 Duct Sensor fixing and connections . . . . 11-2**

**Figure 12-1 Manual Call Point parts . . . . . 12-2**

**Figure 13-1 Alarm Sounder fixing and connections . . 13-1**

**Figure 14-1 Interface Unit with the door open . . . . . 14-1**

**Figure 14-2 Interface unit with the door open . . . . . 14-2**

**Figure 14-3 Connections Details . . . . . 14-3**

**Figure 15-1 Interface unit fixing and connections . . . 15-1**

**Figure 15-2 Line module internal connection details . 15-2**

**Figure 16-1 Supply Unit fixing details . . . . . 16-1**

**Figure 16-2 PSU to interface unit connections . . . . . 16-2**

**Figure 17-1 Loop powered zone module**

**with lid removed . . . . . 17-1**

**Figure 18-1 Single Channel Interface (lid removed) . . 18-1**

**Figure 19-1 Senator II Network Schematic . . . . . 19-1**

**Figure 20-1 Network Interface Fixing and Connections 20-1**

**Figure 21-1 Control Panel to . . . . . 21-1**

**Figure 21-2 Network Interface to . . . . . 21-2**

This page left intentionally blank

# Notes to Installer

The manual contains fixing and wiring information to cover the installation of the Senator II system, both Standalone and Network.

## Installation requirements

It is recommended that the installer follows the general requirements of *BS5839:Part 1:1988*, which is the *code of practice relating to the fire detection and alarm systems for buildings*. The relevant parts of the *Institute of Electrical Engineers Wiring Regulations 16th edition* must also be followed.

## Second fix installation

To prevent the possibility of damage or dirt degrading the performance or appearance of the Senator II products, the installation of second fix items should be delayed until all major building work in the area is complete (e.g. clearing and sweeping).

## Fixture and fittings

It is the installers responsibility to provide adequate fixtures and fittings for the type of construction surface onto which a product is to be installed, whilst utilising the fixing points on the respective product. As an aid to this decision, the weight and overall size of each full assembly together with implications on cable entries and routing should be taken into consideration.

> ***NOTE:*** *All these procedures assume that the cable, glands, steel boxes (BESA boxes) and other related accessories are provided by the installer.*

## Location

The installer should acquire site specific information from the interested parties, for details on the location of products for installation. The acquired information together with this guide and the relevant standards should be used to assist the work.

Each product assembly can be identified from its package label. The contents of all packages should be checked for any discrepancies.

## Fire sensor covers

Each fire sensor may be supplied with a plastic dust cover. If supplied then the dust cover **must be fitted** to prevent dust and dirt from the building work from contaminating the sensor.

### Parts for later installation

All unused parts should be retained in their respective container for safe keeping until required.

> ***NOTE:*** *The installation of all outstanding parts is usually carried out during Commissioning of the System.*

### Loop earth continuity

To maintain earth continuity on a loop, the **loop cable screen** must be connected through each system device on the loop, whether the earth is connected to a device or not

> **NOTE:** *The network cable screen is earthed at one end only.*

### Mains supply

Mains supply to fire alarm control and indicating equipment must be via an **unswitched fused spur** unit.

The fused spur isolator cover should be red and marked:

**FIRE ALARM - DO NOT SWITCH OFF**

Each of the fire alarm equipments' fused spur units must be fed from a dedicated switch or protective device at the local mains supply distribution board.

### Mains and battery supply connections

The mains and battery supply cables must be installed to the stage to **facilitate the power up** for commissioning.

> ***WARNING:*** *Where mains cable are to remain disconnected, their tail ends must be insulated to prevent dangerous conditions arising in the event of accidental switching On of the mains supply*

### Cable termination and connection

Terminate each cable at the entry point to the enclosure, using the cable manufacturer's recommended techniques.

Where the cable is required to be connected, ensure it is secure to the respective terminal.

Where the cable is not required to be connected, leave **400mm (**unless otherwise specified) tail wire length and **mark each core** identifying its final point of connection.

### Wiring test

> ***CAUTION:*** *DO NOT undertake high voltage insulation tests WITH THE CABLES CONNECTED to their terminals. Such a test may damage the electronics circuitry in loop devices and panels.*

# EMC Compliance

## Installation guidelines for compliance with the requirements of the Electromagnetic Compatibility (EMC) Directive

**Introduction**

These guidelines should be followed to meet the requirements of the **EMC directive** in force within the **European Union**, to prevent the **reception** and **emission** of electromagnetic interference into and out of the **analogue addressable** fire detection and alarm system.

**Products**

The products covered by these guidelines are listed under **EMC compliant products**, see list on the last page of this section.

**Code of practice**

The installer must follow *BS7671 : 1992 Requirements for Electrical installations, IEE wiring regulations 16th edition* if installation is in the United Kingdom, UK.

**Cables**

The following cables have been tested against EMC directives for use with with fire detection and alarm applications:
(see also the **Cable types** part of **Installation manual** for further information)

☐ For **loop circuit, battery connection and master alarm circuit** wiring:

- Mineral Insulated Copper Cable (MICC)
- FIRETUF OHLS Cable *type: FTZ2E1.5*

☐ For **network interface to network interface** or **control panel to network interface** wiring:

- Mineral Insulated Copper Cable[1] (MICC)
- Belden Cable *No 9729 (UL Style 2493)*
- Armoured Cable[2]
  By armouring the Belden Cable *No 9729* (*UL Style 2493*)

In the UK, the guidance of BS5839 : Part 1 should also be followed.

1 The Mineral Insulated Copper Cable should be used for fire resistant applications.

2 The cable manufacturer cannot guarantee the cable specification if it is armoured.

### Cable Separations

The cables of the fire detection and alarm system and other systems should usually be separated by at least **160mm**, unless dedicated conduit or ducting is being used.

In the UK there is additional guidance provided in a document reference *'Recommended cable separations to achieve electromagnetic compatibility in buildings'* obtainable from the **Electrical Contractors Association.**

### Earth continuity

All earth connection points should be **clean to provide a good electrical conductivity path.**

To maintain the earth continuity:

- ☐ all **earth leads and fittings** provided should be installed
- ☐ the **loop cable** screen must be continued through each system device on the loop, whether the earth is connected to the device or not.

see also Cable termination.

> ***NOTE:*** *Do not use any part of building structure for earthing.*

A **zinc coating** is provided around the termination point, on the inside of an equipment metal enclosure. This provides a good electrical conductivity path for cable earth termination.

> ***CAUTION:*** *The zinc coating should not be damaged. Any damage will expose bare metal, which can corrode and make poor earth connection.*

There are **copper fingers** fitted to the control and indicating equipment to fill the gap between enclosure and cover. The fingers provide a shield against electromagnetic and radio frequency interferences.

> ***CAUTION:*** *It is important to avoid damage to the* ***copper fingers****, as this can re-introduce gap between enclosure and cover.*

### Mains Supply

The mains supply to mains operated equipment should enter the enclosure by a dedicated entry, which is the closest to the mains connection points.

### Cable termination

Use only cable manufacturers recommendations for cable termination.

The wires between the termination point and terminals should be **short** and as **straight** as possible.

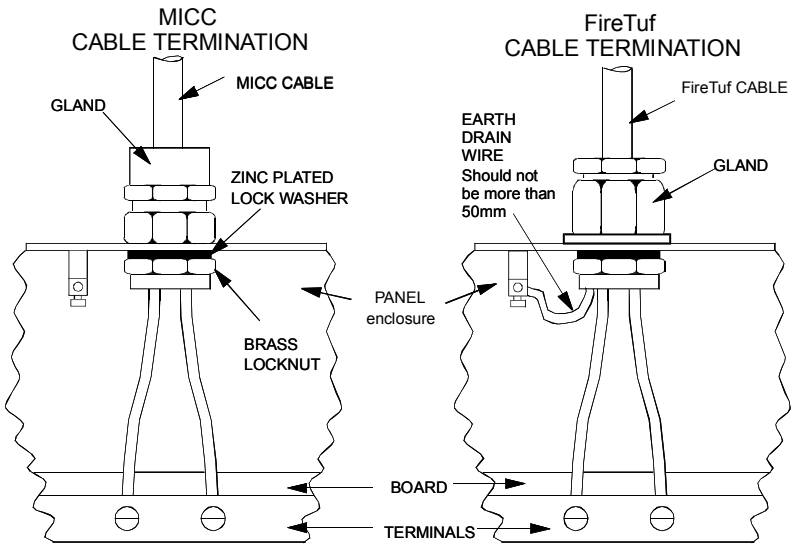



Figure 2-1 Cable termination

fl198

Where Mineral insulated cable (MICC) is being used:

- ☐ use only **galvanised finish junction boxes** for installation of alarm and detection devices
- ☐ use brass locknut with zinc plated lockwasher to secure gland to the metal enclosure.

There is no need to use ***earth tail seals*** when terminating mineral insulated cable, providing there is good earth continuity between gland and enclosure.

When using **Firetuf** cable, the *earth drain wire* should be fitted to the earth point nearest the cable entry, with a length not exceeding **50mm**.

## Board fixing

Ensure all board fixing screws are fully tightened, if they have been removed during installation. The screws maintain an earth continuity path between the board and its metal enclosure.

## EMC compliant products

The products listed below are those covered by these guidelines.
Note, the product options are not listed.

**Control and indicating equipment:**
78500-02NM
78600-01NM

**Interface equipment:**
78301-01NM
78321-01NM
78345-06NM
78310-01NM
78315-01NM

**Fire Sensors:**
78200-01NM
78215-01NM
78275-01NM
78220-01NM
78230-01NM
78260-01NM
78285-01NM

**Manual Call Point:**
78150-52NM
78155-52NM
78150-22NM
78150-55NM
78150-25NM

**Tee Breaker and Slave Units:**
78299-01NM
78299-02NM
78299-03NM

**Alarm Sounder:**
78400-02NM
78400-03NM
78277-01NM

**Network:**
78520-01NM

This page has been intentionally left blank.

# LVD Compliance

## Installation guidelines for compliance with the requirements of the Low Voltage Directive (LVD)

**Introduction** These guidelines should be followed to meet the *requirements for the safety of Information Technology equipment, including electrical business equipment - BS EN 60950: 1992.*

**Products** All Senator II Panels.

**Guidelines**

☐ Ensure the EMC Compliance Guidelines are followed.

☐ Each of the Fire Alarm equipments' fused spur units must be fed from a dedicated switch or protective device at the local mains supply distribution board. If a single pole disconnect device is used (on Live Side) then the Neutral (N) should be clearly labelled.

☐ Cable Glands should be used on the equipment for the mains supply cable.

☐ Unused knockouts that have been removed, should not be left open.

☐ Power supply cords shall:

- If rubber insulated, be of synthetic rubber and not lighter than ordinary tough rubber sheathed flexible cord according to IEC 245 (designation H05 RR-F).
- If polyvinyl chloride (PVC) insulated and for equipment having a mass exceeding 3kg, be not lighter than ordinary polyvinyl chloride sheathed flexible cord (designation H05 VV-F or H05 VVH2-F2).
- Include, in the case of **Class 1 Equipment,** a green/yellow protective earthing conductor electrically connected to the protective earthing terminal within the equipment and connected to the protective earthing contact of the plug, if any.
- Have conductors with cross sectional areas of not less than 0.75mm.

**NOTE:** *For rated currents of up to 3A, a nominal cross sectional area of 0.5mm$^2$ is permitted provided the length of the cord does not exceed 2m.*

This page left blank intentionally.

# Cable Types

## Loop cables

The cable is an important part of the Senator II fire alarm system, which carries both communication data and power supplies. Its integrity is therefore essential for fire detection and alarm signals to be processed to keep the system operational.

### Loop Cable type and Specification

☐ **Mineral insulated copper cable** (EMC Compliant)

- *BS6207: Part 1*
- fire resistance tested to *BS6387 categories CWZ*
- having continuous metal sheath encapsulating
- 2- cores
- each core having **1.5mm$^2$** cross section area
- a **red** cover sheath (preferred for alarm applications)
- core to core capacitance **190pF/m**
- core to screen capacitance **220pF/m**

☐ **Delta Crompton FDZ2E1.5 FireTuf OHLS fire resistant data cable** (EMC Compliant)

- Two core plus earth wire
- each core having **1.5mm$^2$** cross sectional area
- to *BS6387 categories CWZ*
- core to core capacitance **115pF**
- core to screen capacitance **205pF/m**

**Loop cable usage**

Must not exceed **1Km**, this includes the cable usage on main loop and spur circuits.

> ***NOTE:*** *Multicore cables having more than 2-cores* ***are not allowed*** *for loop wiring, due to inadequate separation and possible electrical interference problems.*

## Alternative Loop cable

> ***CAUTION:*** *In countries where the* ***European EMC directive*** *is in force,* ***only*** *those cables detailed in the* ***EMC Compliance*** *part of this manual may be used.*

Alternative cable types with may be acceptable providing:

☐ The cable is to *BS6387* having

- typically no more than **1km** cable usage per loop circuit
- no more than **2 - cores**
- a maximum of **0.5uF** total intercore capacitance
- a maximum of **13** ohms per core
- each core having no less than **1.5mm$^2$** cross section area
- with an inherent or through metal conduit screen for earth continuity in order to produce electrical protection and screening
- having protection from heat and mechanical damage
- the cable screen must be capable of being earthed at each system device (outstation)

# Network Cables

> ***CAUTION:*** *In countries where the* ***European EMC directive*** *is in force,* ***only*** *those cables detailed in the* ***EMC Compliance*** *part of this manual may be used.*

The cable used to connect: ***78500 Control Panels*** to ***78520 Network Interfaces*** and ***78520 Network Interfaces*** to each other **MUST** be one of the following

**Recommended Cables**

☐ Huber & Schner Radox series FR communication cable

1200m maximum ***Network Interface*** to ***Network Interface***
**10m** maximum ***Control Panel*** to ***Network Interface***

- Three core twisted triad screened
- **1.5mm$^2$** (7/0.42 stranded) conductors
- Nominal impedance **200ohms** (1KHz)
- Capacitance between conductors **110pF/m** (1KHz)
- Capacitance between screen to core **210pF/m** (1KHz)
- Fire resistance tested to *BS6387 category CWZ* and *IEC 331*.

☐ Mineral insulated copper cable (EMC Compliant)

**600m** maximum ***Network Interface*** to ***Network Interface***
**10m** maximum ***Control Panel*** to ***Network Interface***

- *BS6207: Part 1*
- **3 parallel** cores
- having continuous metal sheath encapsulating
- each core having **1.5mm$^2$** cross section area
- a **red** cover sheath (preferred for alarm applications)

☐ **Belden No 9729 (UL Style 2493)**

☐ **Teflon jacketed Belden TR No. 89729**

**1200m** maximum ***Network Interface*** to ***Network Interface***
**10m** maximum ***Control Panel*** to ***Network Interface***

Both cables must have following characteristics:

- Two twisted pairs
- Each pair individually screened
- 24AWG (7 strands x 32 AWG)
- Low capacitance between conductors - **41pF/m** at 1kHz
- Low capacitance conductor to screen - **76pF/m** at 1kHz
- Temperature range **-30$^o$C** to **+60$^o$C** .
  (Teflon jacketed cable 89729 up to 200$^o$C)

☐ **Belden Armoured equivalent** (EMC Compliant)

**800m** maximum ***Network Interface*** to ***Network Interface***
**10m** maximum ***Control Panel*** to ***Network Interface***

- This cable being a two pair cable to *BS5308:Part 1 (type 2)* 0.5mm$^2$ (16/0.2mm).

☐ **Belden No. 9842 EIA RS485 Applications, O/A Beldfoil® Braid**

**1200m** maximum ***Network Interface*** to ***Network Interface***
**10m** maximum ***Control Panel*** to ***Network Interface***

Must have following characteristics:

- Two twisted pairs
- 24AWG (7 strands x 32 AWG) conductors
- Low characteristic impedance - 120 ohms
- Low capacitance between conductors - 42pF/m at 1kHz
- Low capacitance conductor to screen - 75.5pF/m at 1kHz

**Beldfoil** is a registered trademark.

This page has been intentionally left blank

# Loop Circuit Connections

The fire alarm system can permit significant reductions in installation costs when compared with conventional and other multi-state systems. This is because of the ability to wire a large number of devices (outstations), like **sensors, sounders, manual call points, interface units** and **repeat panels** on one loop circuit.

## Loop Capacity

> ***NOTE:*** *It is important that redundancy is built into the system to accommodate future expansions.*

### Devices (Outstations) per loop

The number of devices (outstations) on one loop circuit can be limited by the total number of addresses available, the electrical load on the circuit, the maximum cable length and other geographical considerations.

A maximum of **200** devices are allowed per loop circuit:

As a general rule allow 1000 load factor per loop circuit.

| Code and device | Load factor for each device | Maximum of each device per loop |
|---|---|---|
| 78400-02, 78400-03 Alarm sounder | 25 | 40 |
| 78277-01NM Repeat Sounder | 8 | 125 |
| 78301-01NM Mains powered interface | 3 | 8 |
| 78321-01NM Loop powered interface | 2 | 30 |
| 78310-01NM Loop powerered Zone Module | 25 | 40 |
| 78315-01NM Single Channel Interface | 10 | 100 |
| 78299-02 or 78299-03 | | |
| Slave LED or Relay unit | 1 | 50‡ |
| 78299-01 Tee breaker | 1 | 200 |
| 78215-01 or 78220-01 or 78230-01 | | |
| Optical, Heat or Ionisation sensor | 1 | 200 |
| 78260-01 Duct Sensor (also needs a Slave LED) | 1 | 50‡ |
| 78275-01 Optical Sensor Sounder | 8 | 125 |
| 78285-01NM Heat Sounder | 8 | 125 |
| 78150 or 78155 Manual call point | 1 | 200 |
| 78600-01 Repeat Panels | 3 | 32 |

‡ *Installations prior to March 1996 have a maximum of 10 slave devices.*

# Loop cable

See the part on Cables

***NOTE:*** *Multi-core cables carrying more than one circuit should never be used.*

# Cable separation

Where the outgoing and return cables of a loop which covers more than the equivalent of one zone must **not** run together, for example, either close to the **Control Panel** or in a **service duct**. There should be as much physical separation as possible between the cables and the mechanical protection of the cable should be to a particularly high standard. This is to minimise the risk of accidental damage to both cables. There should be separation from the mains supply cable.

# Loop Coverage

A loop circuit must not cover more than **10,000m$^2$** of floor area of a protected site.

# Spur circuits

Where appropriate, a spur circuit may be used in order to save cable and, therefore, installation cost. A device (outstation) has terminals for cable connections. The 2-way type allows straight **in-out** connection, while the 3-way has an added common line connection, that is **in-out-comm line**. The spur circuit must always be taken from the **line com** terminals.

**NOTE:** *3-way devices are only available as sounders, interfaces and repeats. If it is not appropriate to use these devices in the required location a 'T' breaker should be used.*

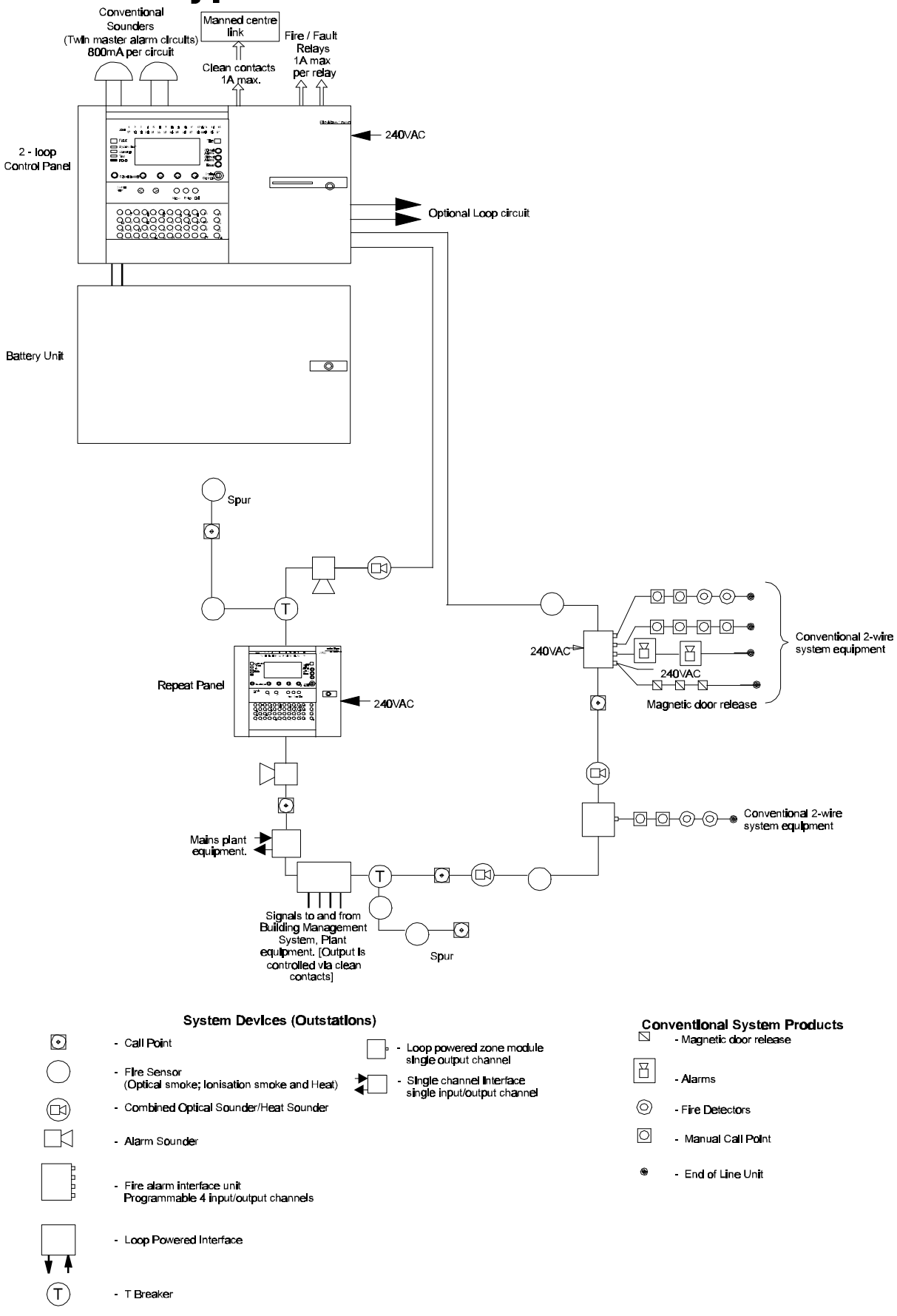
***NOTE:*** *Spurs should not cover more than the equivalent of one zone as defined in BS 5839 : Part 1 : 1988.*

***NOTE:*** *The common line to accept spurs may be left unconnected, if using the device for 2-way connection.*

# Lightning protection

***CAUTION:*** *Lightning protection must be used if a loop cable is routed on exterior wall of a building.*

# Typical Senator II Architecture




cdn1

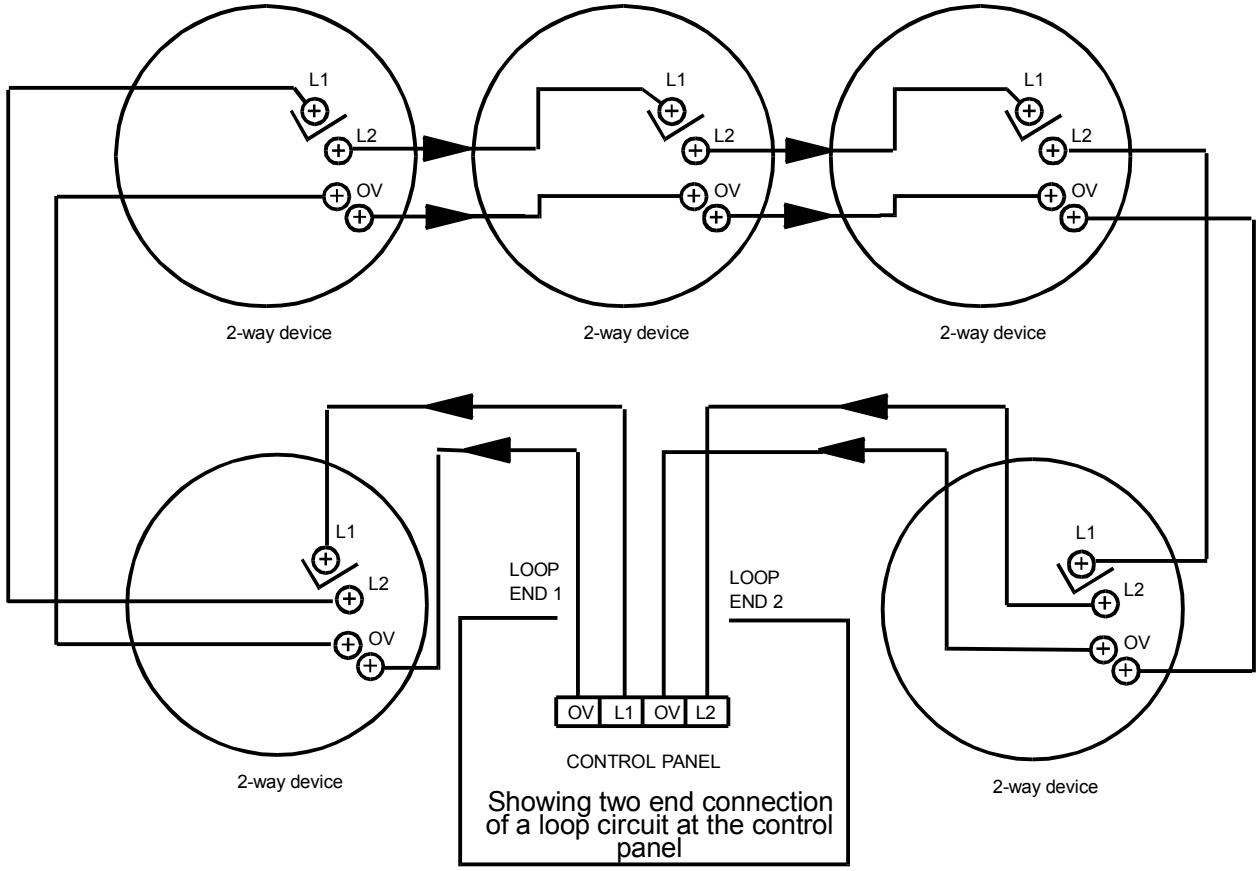
Figure 5-1 Typical fire alarm system

# Earth Continuity

To maintain ***earth continuity,*** the loop cable screen must be continued through each system device on the loop, whether the device is earthed or not..

# Control Panel connections

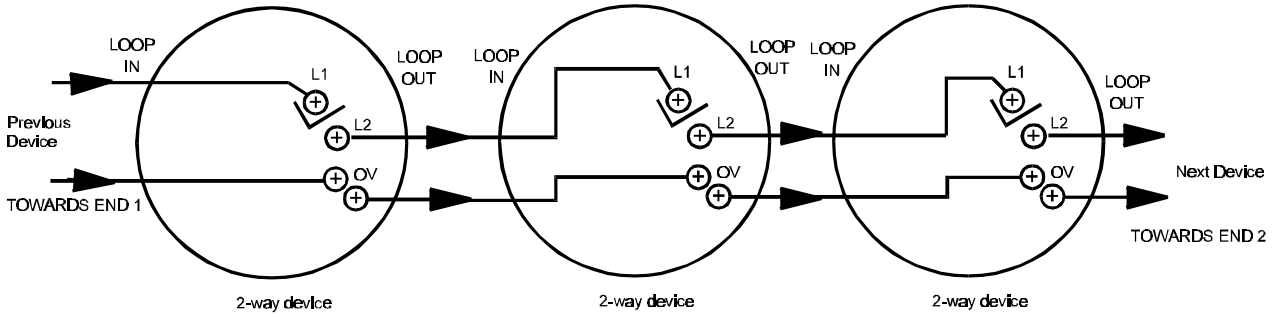
***NOTE:*** *The previous or next device connection can be a loop device or an end connection to the control panel.*




fl174

Figure 5-2 Connections to the Control Panel

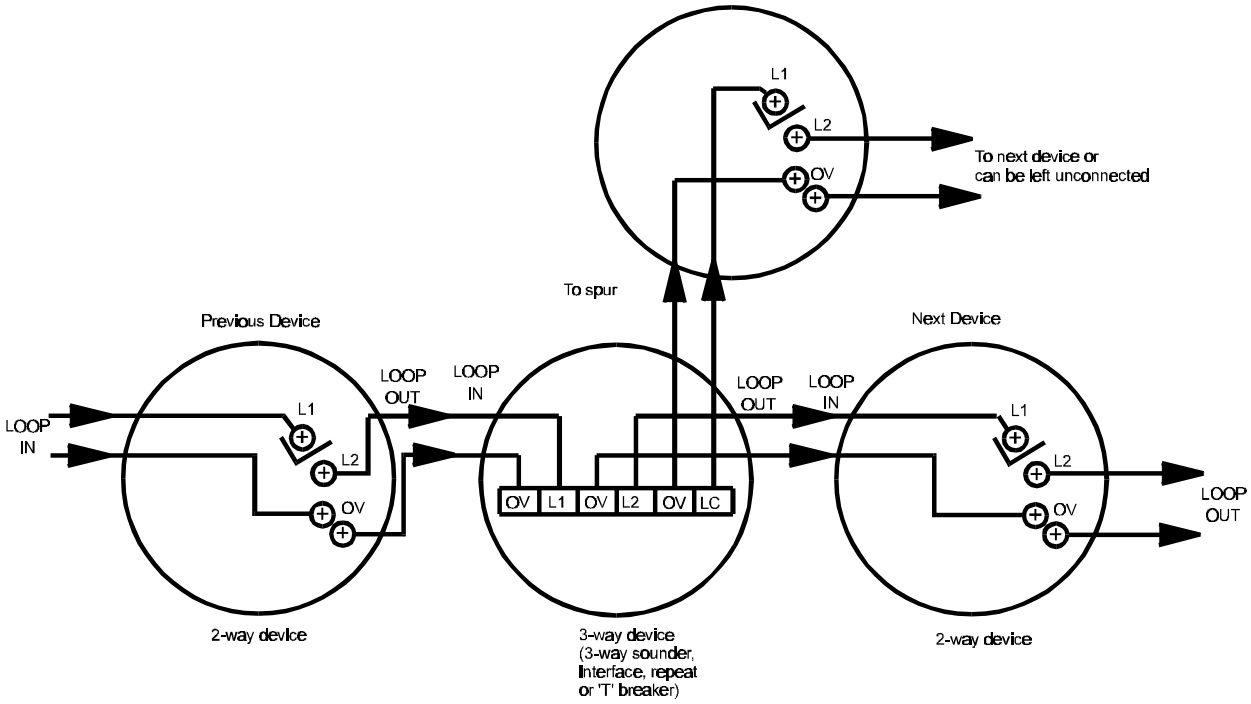
# 2-way device




shfl172

Figure 5-3 Connecting a 2-way device

# 3-way device




cdn16

Figure 5-4 Connecting a 3-way device

# Slave (Indicator) LED Unit

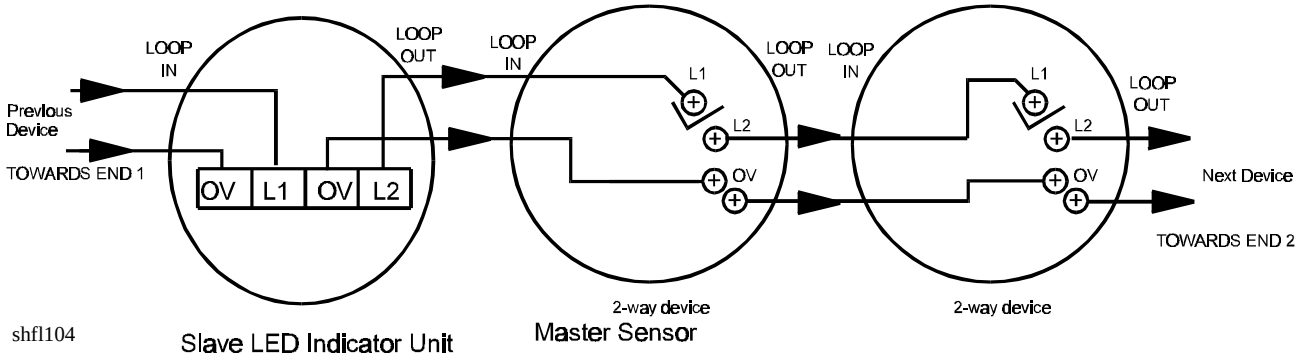



Figure 5-5 Connecting a slave Indicator unit

> ***NOTE:*** *The* ***slave LED unit*** *must always be connected before the respective* ***master sensor*** *relative to End 1 of the loop. The* **slave LED** *'attaches' itself to the* **master sensor** *and reflects the state of this device*

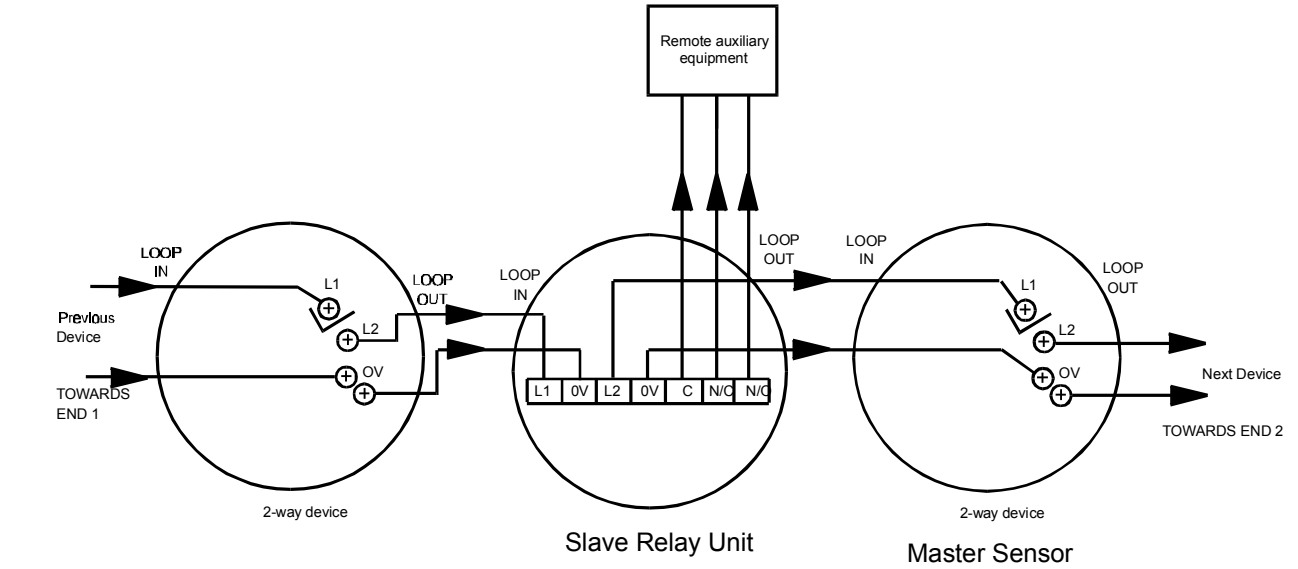



Figure 5-6 Connecting slave relay unit

# SlaveRelay Unit

> ***NOTE:*** *The* ***slave Relay unit*** *must always be connected before the respective* ***master sensor*** *relative to End 1 of the loop. The slave relay unit 'attaches' itself to the master sensor and reflects the state of this device.*

# Standalone System Installation

## 78500-02NM Fire Alarm Control Panel Set

The 78500-02NM Control Panel Set consists of two (or more) packages:

- ☐ 78500-82NM Fire Alarm Control Panel
- ☐ 78510-02NM Battery Unit
- ☐ 78534-82NM Power Supply Unit and/or 1-5 Cards (see supplier for details)

### 78500-82NM Fire Alarm Control Panel

**Where appropriate refer to as fitted wiring diagrams (if supplied), general notes, EMC compliance, LVD Compliance, cable types and loop circuit connections.**

## Fuses and locations

| Fuse | Rating | Location |
|---|---|---|
| Mains | 20mm x 5mm 3.15A SD | Mains terminal block |
| FS1 | 20mm x 5mm 1A HRC# | Master alarm terminal board |
| FS2 | 20mm x 5mm 1A HRC# | Master alarm terminal board |
| FS1 | 20mm x 5mm 8A QB | Power supply pcb |
| FS2 | 20mm x 5mm 8A QB | Power supply pcb |
| FS3 | Not fitted | |
| FS4 | Not fitted | |
| FS5 | 20mm x 5mm 8A QB | Power supply pcb |
| FS6 | 20mm x 5mm 8A QB | Power supply pcb |

# - Master Alarm fuses

The control panel can be **surface or flush** mounted. If however the battery Unit is to be close fitted beneath the control panel then the two can **only** be **surface mounted**.

***CAUTION:*** *4off 12V @ 12.0Ah Sealed Lead Acid batteries must be used for the control panel.*

**NOTE:** *The battery box can accomodate up to 8 batteries to allow for additional standby time.*

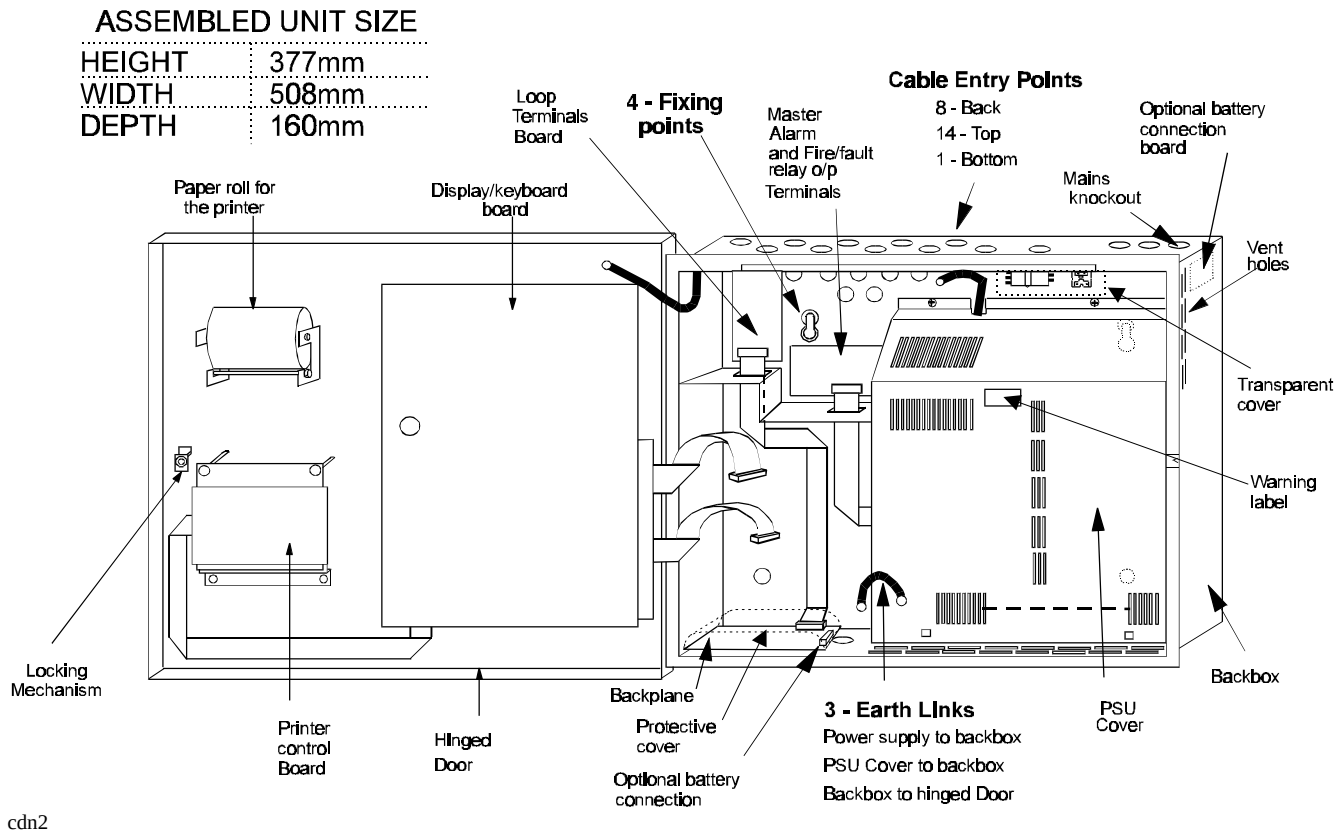



Figure 6-1 Control Panel with the door open

## Door removal

a) Identify the package labelled FIRE ALARM CONTROL PANEL and check the contents, which should include:

| Component | Quantity |
|---|---|
| Control panel | 1 |
| Door key | 1 |
| Enable controls key | 2 |
| Fuse 1A | 2 |
| Fuse 8A | 1 |
| Fuse 3.15A | 1 |
| Resistor 22K Ohms | 2 |
| Battery cable assembly | 1 |

b) Open the panel door using the door key.

c) Remove the **earth lead** from *upper case earth* to *PSU terminal block.*

d) Disconnect the two ribbon cables from the **display/keyboard board**, located on the inside-left of the door assembly.

e) Remove the **door** from the back box assembly, by sliding it up and off.

f) Remove the *power supply cover to back box* **earth lead**.

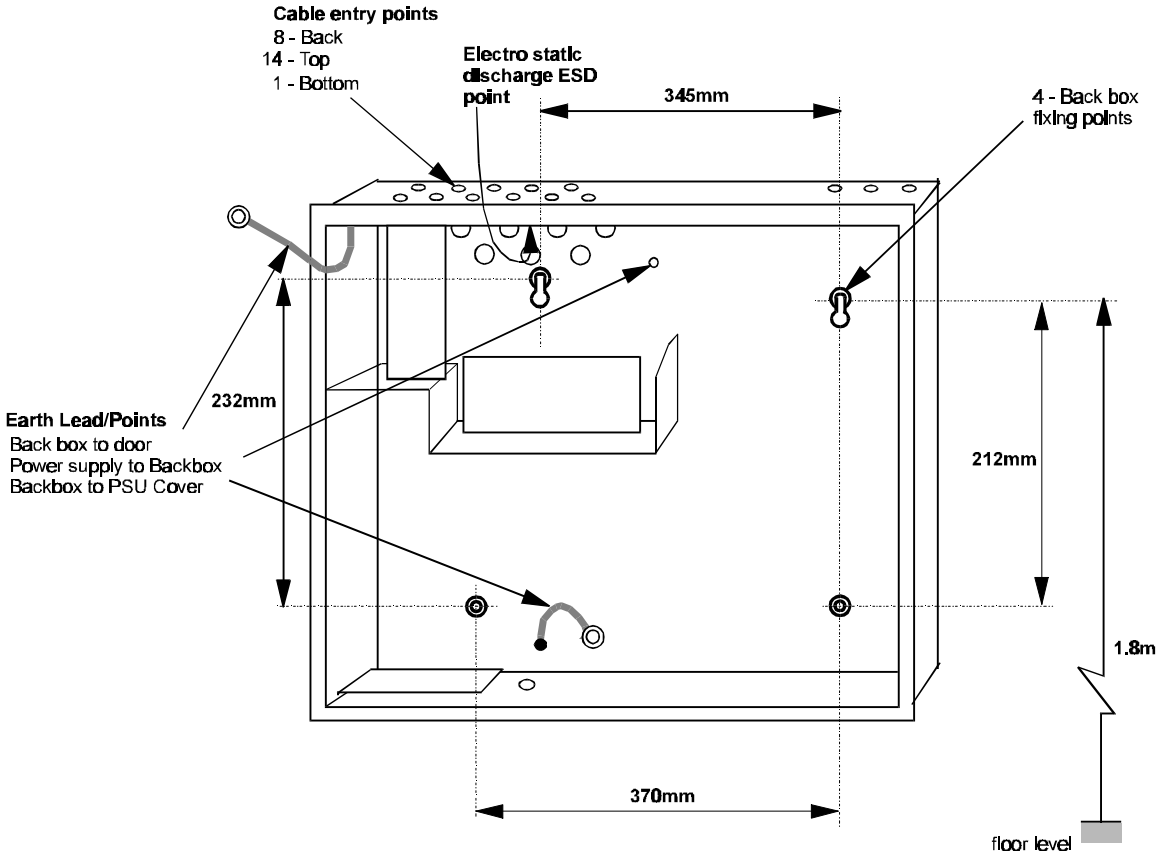



Figure 6-2 Control Panel Back box shown without door

cdn3

g) Remove the power supply cover by removing the three fixing screws and loosening the two captive screws at the top of the cover.

h) Knock out/in the required **cable entry** points from the back box.

> ***NOTE:*** *The battery cable can enter the backbox in one of two locations (top-right or bottom-center right). Only knock out/in the one that is required.*

**Flush mount**

i) If the panel is to be **flush mounted** then follow the instructions for flush mounting control panel now. Once flush fixing is complete, or if panel is to be **surface mounted** continue with j) below.

j) Mark out the back box **fixing points** on the wall to which the panel is to be mounted.

k) Secure the back box to the wall with suitable fixings to provide adequate support for a full assembly weight of **16kg.**

l) Terminate each cable at the entry point leaving **400mm** tail wire length and mark each core to identify its intended connection point.

> ***WARNING:*** *The mains cable tail ends must be insulated to prevent dangerous conditions arising in the event of accidental switching ON of the mains supply.*

**Battery unit**

m) If the **battery Unit** is to be **close fitted** beneath the control panel then follow the battery Unit fixing instructions now. Once the battery unit is installed, or if it is to be installed **remotely** continue with n) below.

**Power supply assembly**

> **NOTE:** *It is recommended that the power supply assembly is left until the commissioning process to avoid damage to the power supply occuring during any subsequent building process*

n) Fit and secure the power supply assembly to the back box by tightening the five captive-screws.

o) Connect the two ribbon cables (from the back plane and terminal card) and the battery cable assembly to the **power supply board.**

> **NOTE:** *For top cable entry the battery cables to be routed to the top battery connection board. For bottom cable entry the battery cables to be routed to the backplane board located in the bottom of the panel.*

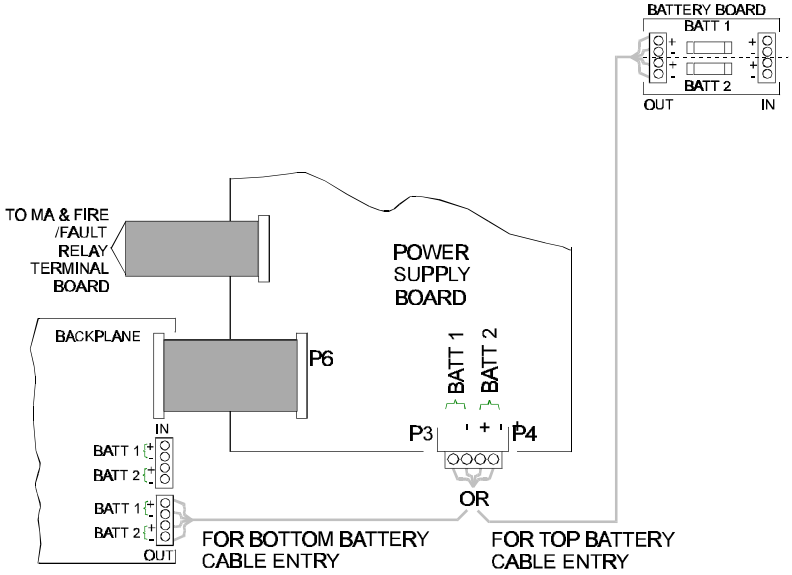



Figure 6-3 Connection of Battery cable assembly

p) Connect the **earth lead** and mains live and neutral from *mains filter* to *PSU terminal block.*

q) Secure the power supply **cover** using previously removed three screws plus the two captive screws.

**Door refitting**

r) Slide on the door to the back box assembly, ensure the door can open and close easily.

s) Connect the previously removed ribbon cables to the controller board on the door assembly.

t) Fit the *door to back box* earth lead.

u) Ensure all cables are secured to the base of the back box.

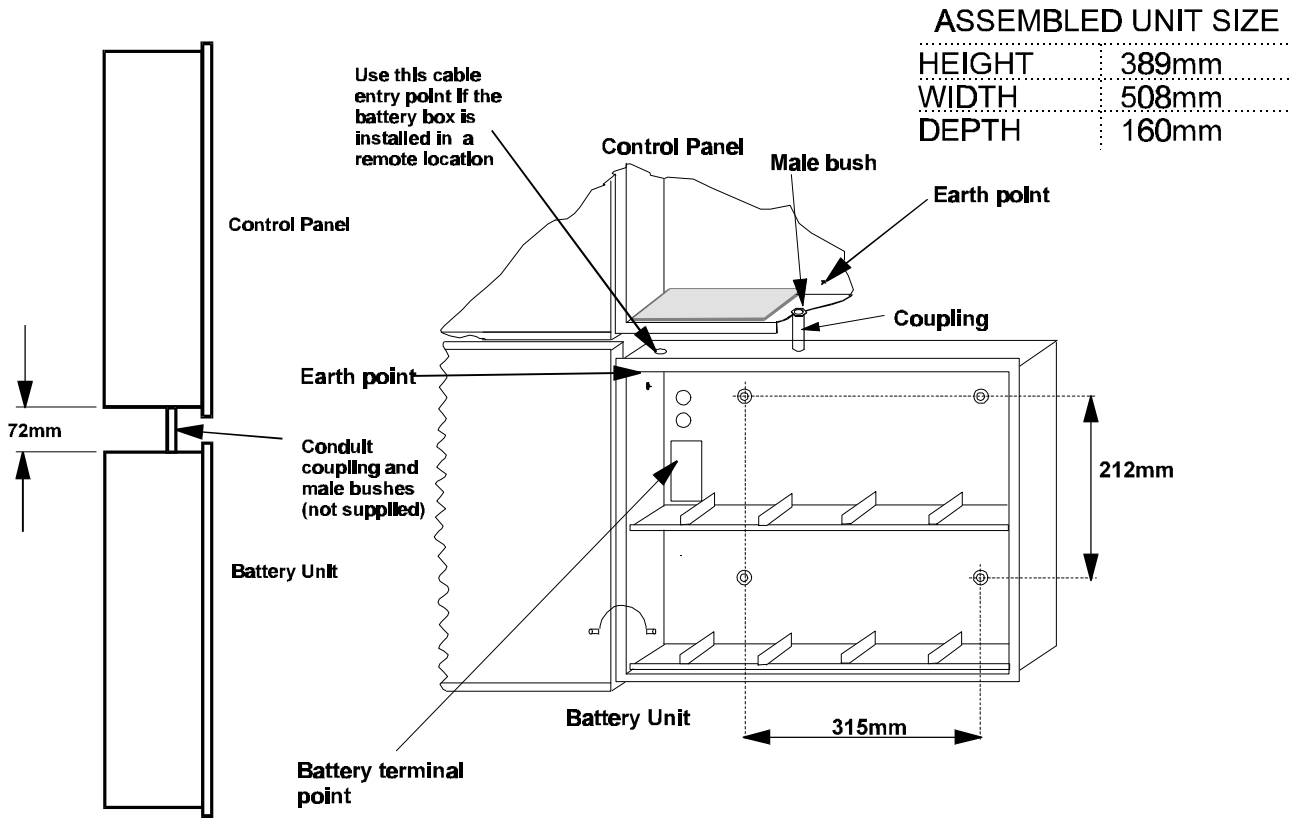
v) Close the door and lock it using the door key. All remaining installation is done during the commissioning of the system

# .78510-02NM Battery Unit

## Fuses and locations

| Fuse | Rating | Location |
|---|---|---|
| Batt1 | 20mm x 5mm 8A | Battery fuse board |
| Batt2 | 20mm x 5mm 8A | Battery fuse board |

The **battery Unit** may be close fitted beneath the control panel using standard conduit fittings (not supplied).




cdn4

Figure 6-4 Close fitting the Panel and Battery Unit

To maintain earth continuity an earth lead (not supplied) is required to be connected between to an earth point in the control panel and battery Unit.

> ***NOTE:*** *The coupling length must not be less than 72mm.*

**Cable and Distance**

The recommended cable type is MICC. The following maximum cable lengths **must not** be exceeded:

| | |
|---|---|
| MICC 1.5mm$^2$ | 10m max. |
| MICC 2.5mm$^2$ | 15m max. |

a) Identify the package labelled BATTERY UNIT and check the contents, which should include:

| Component | Quantity |
|---|---|
| Battery Unit | 1 |
| Door key | 1 |
| Fuse 8A (Battery) | 2 |
| Battery cable loom | 2 |
| Battery link | 4 |
| Nut and washer (for earth stud) | 1 |

b) Open the battery unit door using the door key.

c) Remove the *back box to door* earth lead.

d) Remove the **door** from the back box assembly, by sliding it up and off.

e) Knock out/in the appropriate cable entries. Mark out the back box **fixing points** on the wall to which the box is to be mounted.

f) Secure the back box to the wall with suitable fixings to provide adequate support for a full assembly weight of **40kg,** (with all 8 batteries installed)**.**

***CAUTION:*** *Do not make the battery connections. This is done during commissioning stage.*

g) Slide the door on to the back box assembly, ensure the door can open and close easily.

h) Fit the *door to back box* earth lead.

i) Close the door and lock it using the door key.

j) Continue with the control panel installation, if the battery Unit has been close fitted to the control panel.

k) All remaining installation is done during the commissioning of the system.

***CAUTION:*** *4off 12V @ 12.0Ah Sealed Lead Acid batteries must be used for the control panel.*

**NOTE:** *The battery box can accomodate a maximum of 8 batteries if required.*

# Fire Control Panel Connections

## Mains Connection

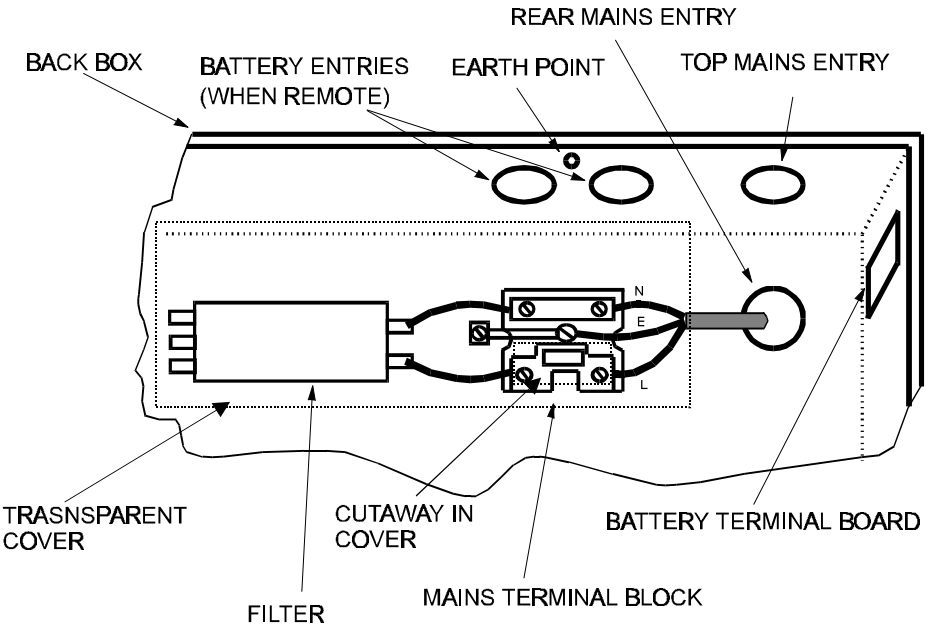



Figure 6-5 Control Panel Mains connection details

cdn5

## Loop, Master Alarms and Fire/Fault Relay Connections

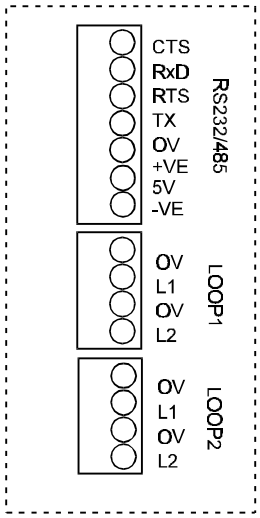
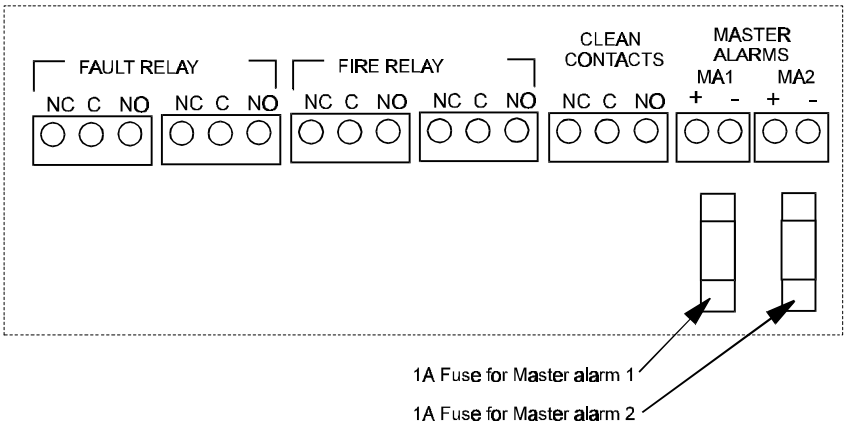



Figure 6-6 Control Panel cable connection points




cdn7

# 78600-01NM Fire Alarm Repeat Panel Set

## 78600-82NM Fire Alarm Repeat Panel

**Where appropriate refer to as fitted wiring diagrams (if supplied), general notes, EMC compliance, LVD Compliance, cable types and loop circuit connections.**

# Fuses and locations

| Fuse | Rating | Location |
|---|---|---|
| Mains | 20mm x 5mm 1A SD | Mains terminal block |
| FS1 | 20mm x 5mm 2.5A QB | MRC pcb |
| FS2 | 20mm x 5mm 2.5A QB | MRC pcb |

The **repeat panel** can be **surface or flush** mounted.

a) Identify the FIRE ALARM REPEAT PANEL package and check the contents, which should include:

| Component | Quantity |
|---|---|
| Repeat panel | 1 |
| Fuse 1A | 1 |
| Fuse 2.5A | 1 |
| Door key | 1 |
| Enable controls key | 1 |

***CAUTION:*** *2off 12V @ 7.0Ah Sealed Lead Acid batteries must be used for the repeat panel.*

b) Open the panel door using the door key.

c) Remove the backbox to door earth lead.

d) Disconnect the two ribbon cables from the main controller board, mounted on inside of door.

e) Remove the door.

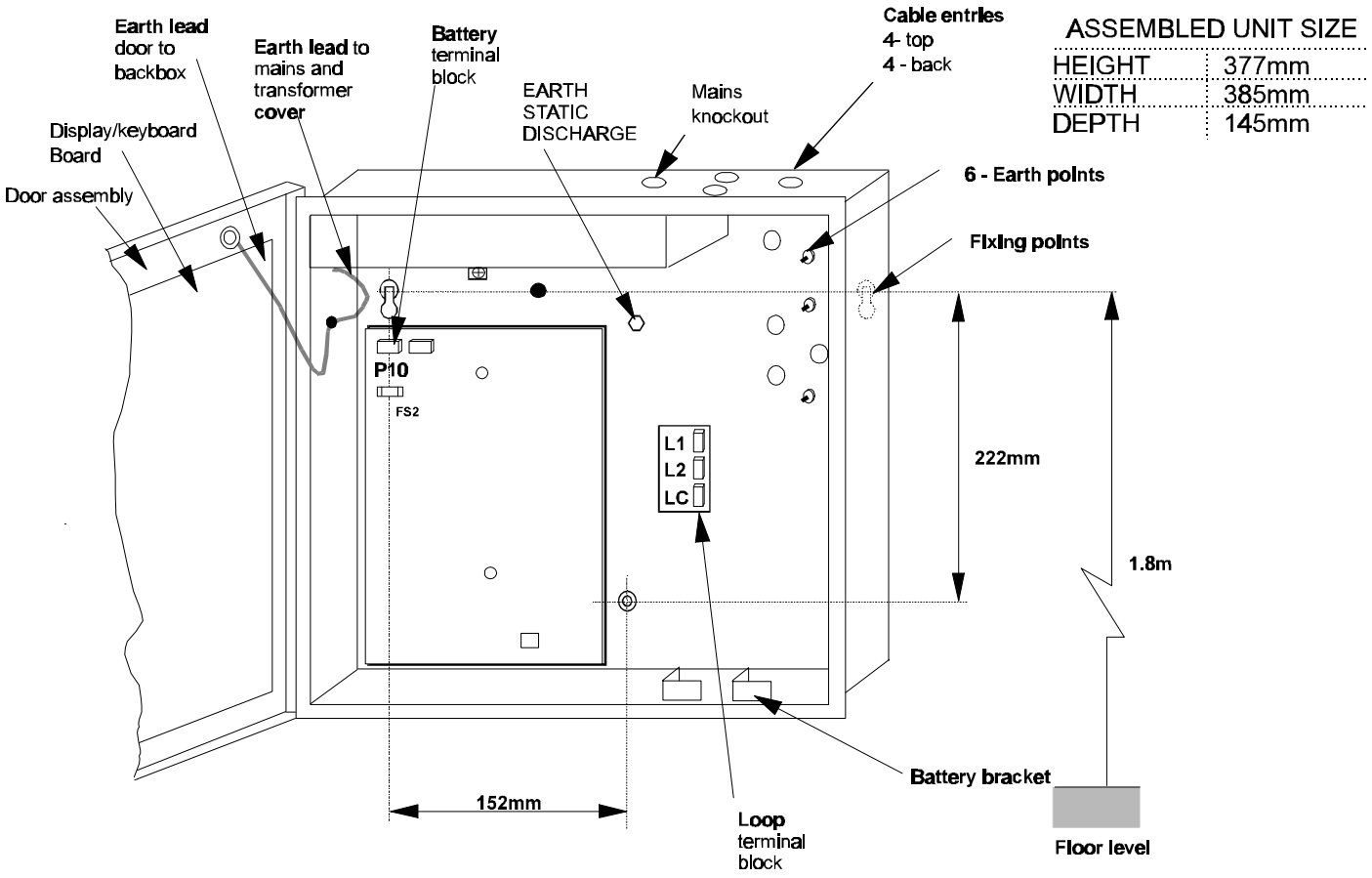
f) Remove the *back box to cover* earth lead.

g) Loosen the *cover captive screw* and then remove the cover.

h) Knockout the required **cable entry** points from the back box.

i) If the panel is to be **flush mounted** then follow the instructions for flush mounting the repeat panel now.

j) Mark out the 3 back box **fixing points** on the wall to which the panel is to be mounted.




cdn11

Figure 6-7 Repeat Panel back box

k) Secure the back box to the wall with suitable fixings to support a full assembly weight, including the batteries, of **14kg**.

l) Terminate the cable at the entry point leaving **400mm** tail wire length.

> ***WARNING:*** *The mains cable tail ends must be insulated to prevent dangerous conditions arising in the event of accidental switching ON of the mains supply.*

m) Secure the cover to the back box using the captive screw.

n) Replace the *cover to back box* earth lead.

o) Re-fit the door, earth lead and ribbon cables previously removed.

p) Close the door and lock it using the door key. All remaining installation is done during the commissioning of the system.

> ***CAUTION:*** *Do not connect the mains and battery cables, these will be connected during the commissioning stage.*

# Fire Repeat Panel Connections

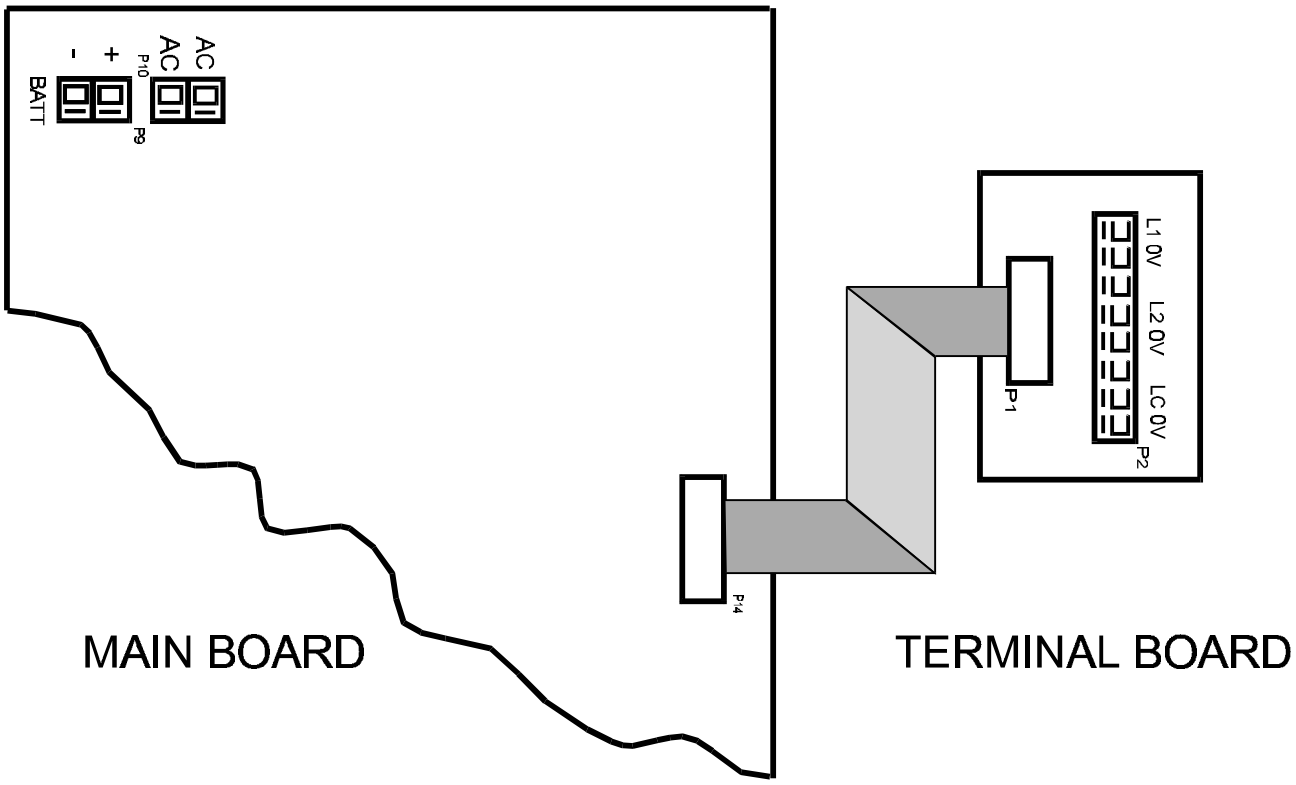



Figure 6-8 Repeat panel connection points

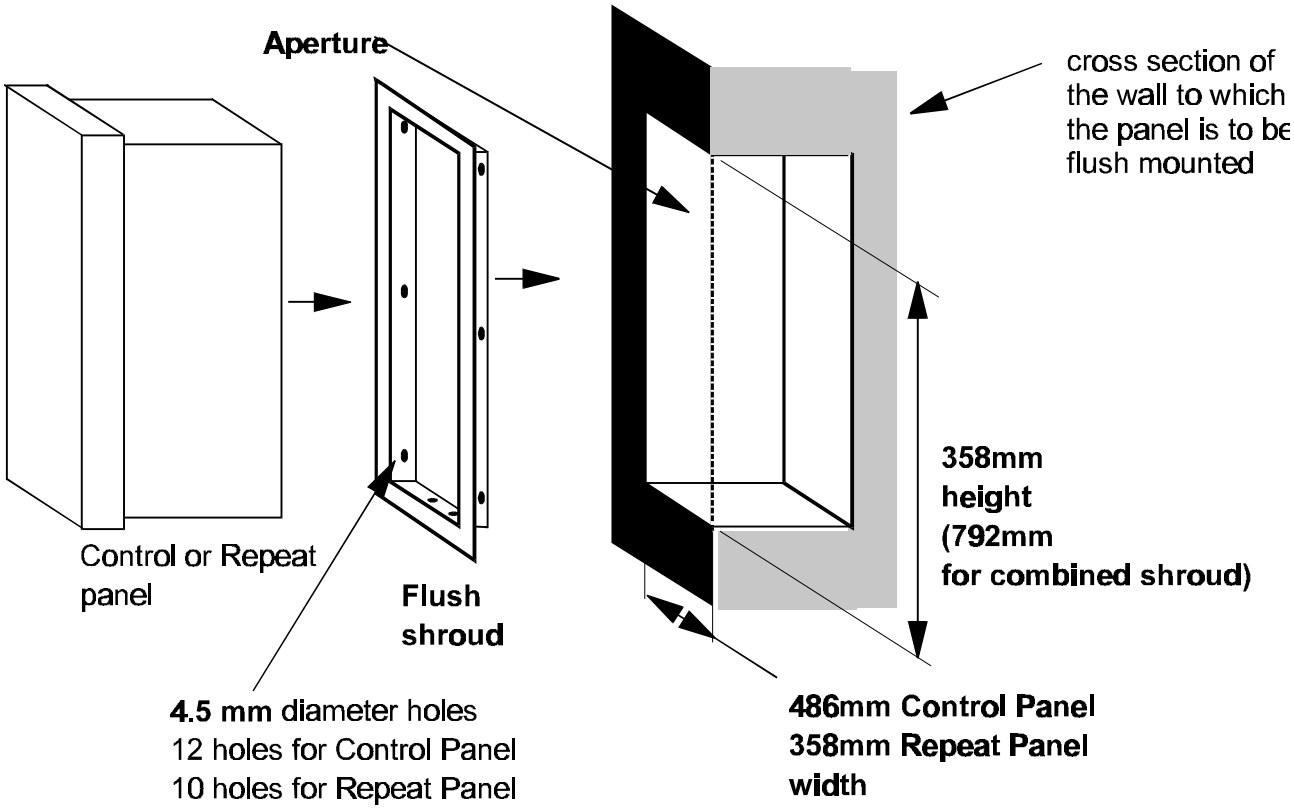
# Flushing Fixing Panels

It is possible to flush fix the control panel, with or without the battery box, and the repeat panel. The following does not cover the battery unit in detail, however the method is the same.

a) Identify the package labelled FLUSH MOUNTING FOR CONTROL PANEL (78500-29NM) or REPEAT PANEL (78600-29NM) and check the shroud. The battery unit is flush mounted by using a COMBINED (78510-29NM) shroud, which is also used for the control panel.

b) Cut out an aperture in the **wall** to allow the flush shroud is to be fitted.

> ***CAUTION:*** *The panel back box may be flushed no more than* ***92mm maximum*** *(for full 180$^{o}$ door opening).*


Aperture
cross section of the wall to which the panel is to be flush mounted
358mm height (792mm for combined shroud)
Control or Repeat panel
Flush shroud
4.5 mm diameter holes
12 holes for Control Panel
10 holes for Repeat Panel
486mm Control Panel
358mm Repeat Panel
width

emfl63

Figure 6-9 Flush fixing the Control or Repeat Panel

c) Use the shroud fixing holes to secure it to the wall.

> **NOTE:** *The combined shroud must be mounted the correct way up - look for the 'TOP' sign on the shroud.*

d) Continue with the control **or** repeat panel installation instructions.

This page left intentionally blank.

# 78200-01NM Terminal Plate

**Where appropriate refer to as fitted wiring diagrams (if supplied), general notes, EMC compliance, cable types and loop circuit connections.**

> ***CAUTION:*** *Use the correct* ***tool*** *and* ***technique*** *to fit or remove any* ***part*** *of the* ***fire sensor*** *or* ***terminal plate.***

To provide the right coverage, each fire sensor must be fitted to a terminal plate in the location as defined by the site specific information.

> ***CAUTION:*** *To prevent* ***dirt*** *and* ***dust*** *in the environment degrading the performance of the* ***fire sensors****, the sensor head installation should be carried out by the installer just prior to the commissioning of the system.*

## Terminal Plate installation

The following illustrations provide information on how to install and wire the sensor terminal plate.

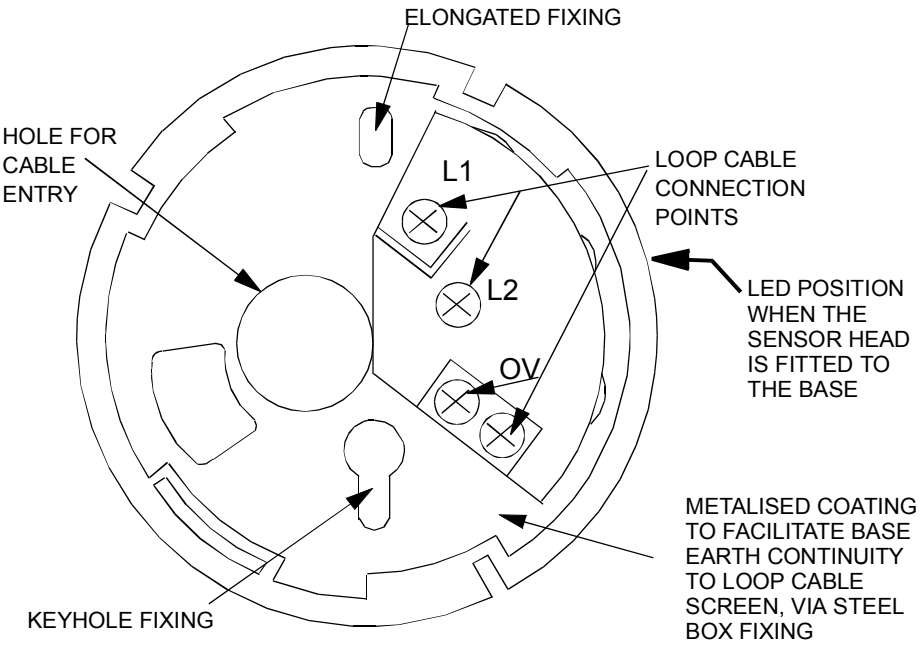

ELONGATED FIXING
HOLE FOR CABLE ENTRY
L1
LOOP CABLE CONNECTION POINTS
L2
LED POSITION WHEN THE SENSOR HEAD IS FITTED TO THE BASE
0V
METALISED COATING TO FACILITATE BASE EARTH CONTINUITY TO LOOP CABLE SCREEN, VIA STEEL BOX FIXING
KEYHOLE FIXING

Figure 7-1 78200-01NM Terminal Plate

fl112

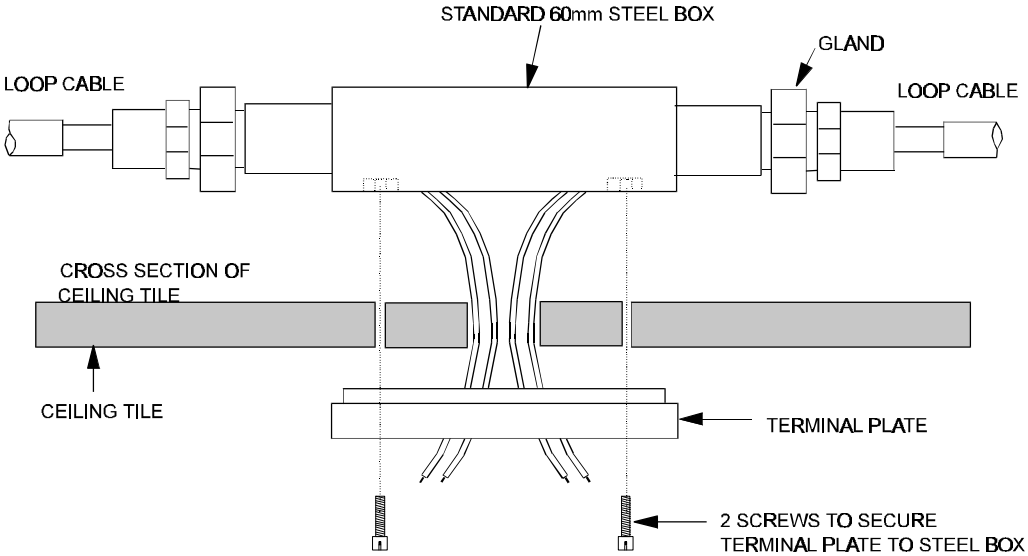



Figure 7-2 Fixing the terminal plate to a ceiling tile

fl114

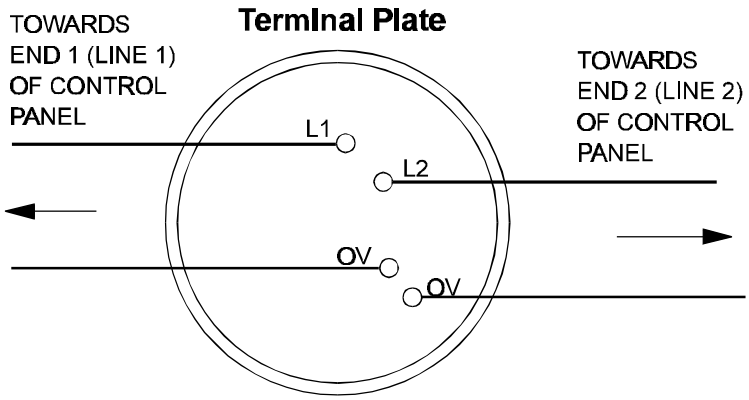



Figure 7-3 Terminal Plate connections

shfl113

## Earthing requirements

***NOTE:*** *It is essential that earth continuity is independently maintained around the loop via the cable screen.*

## Terminal Plate wiring

To correctly wire the terminal plate:

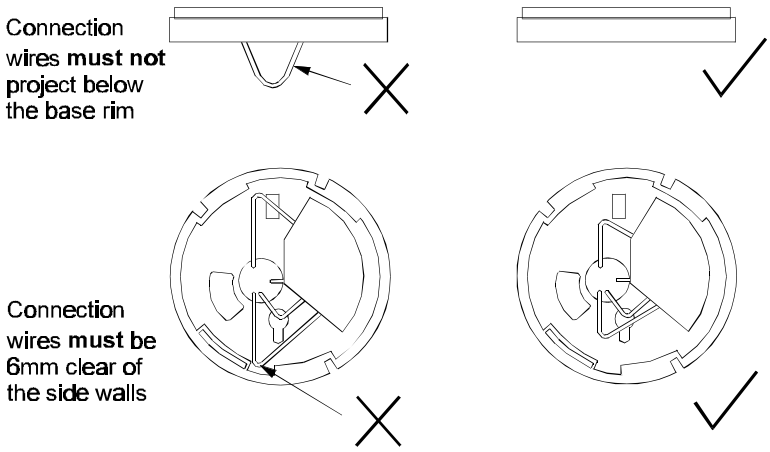



Figure 7-4 Wiring the terminal plate

fl374

# Fire sensors

**Where appropriate see, general notes and EMC compliance.**

***CAUTION:*** *To prevent damage to a* ***sensor****, the correct* ***tool*** *and* ***technique*** *must be used when removing or fitting sensor, or its sub assembly, to and from terminal plate.*

***CAUTION:*** *Damage will occur if undue force is used on fitting or removal of any part of a sensor assembly.*

A **78200-01NM terminal plate** provides 2-way loop connection to a sensor, for the following devices:

| | |
|---|---|
| 78215-01NM | Optical sensor |
| 78220-01NM | Heat sensor |
| 78230-01NM | Ionisation sensor |
| 78275-01NM | Optical sensor sounder |
| 78285-01NM | Heat sounder |

# Fitting a sensor head to terminal plate

To fit a **fire sensor head** to a **terminal plate,** use the **extractor cup 78290-01NM.** For easy-to-reach **terminal plate**, the **sensor head** may be held in hand.

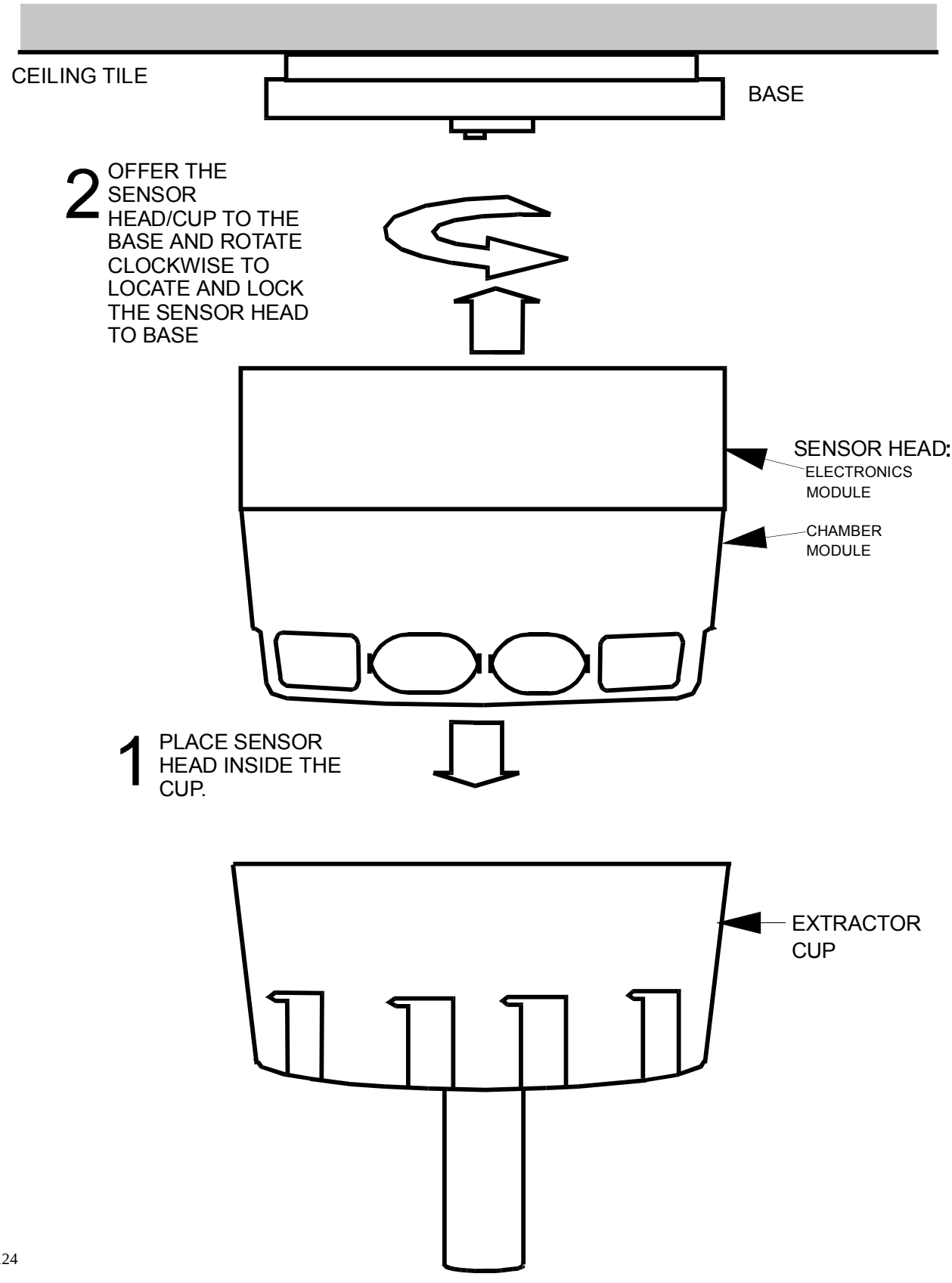

CEILING TILE
BASE
2 OFFER THE SENSOR HEAD/CUP TO THE BASE AND ROTATE CLOCKWISE TO LOCATE AND LOCK THE SENSOR HEAD TO BASE
SENSOR HEAD:
ELECTRONICS MODULE
CHAMBER MODULE
1 PLACE SENSOR HEAD INSIDE THE CUP.
EXTRACTOR CUP
fl124

Figure 8-1 Fitting a sensor head to terminal plate

# Removal of sensor head from terminal plate

Use the **extractor cup** 78290-01NM, and the **correct electronics module removal tool**: 78290-02NM for Optical (sounder) sensor
78290-03NM for Ionisation sensor
78290-04NM- for Heat sensor

a) Using the extractor cup, remove the **chamber module** from the **electronics module** of the sensor head

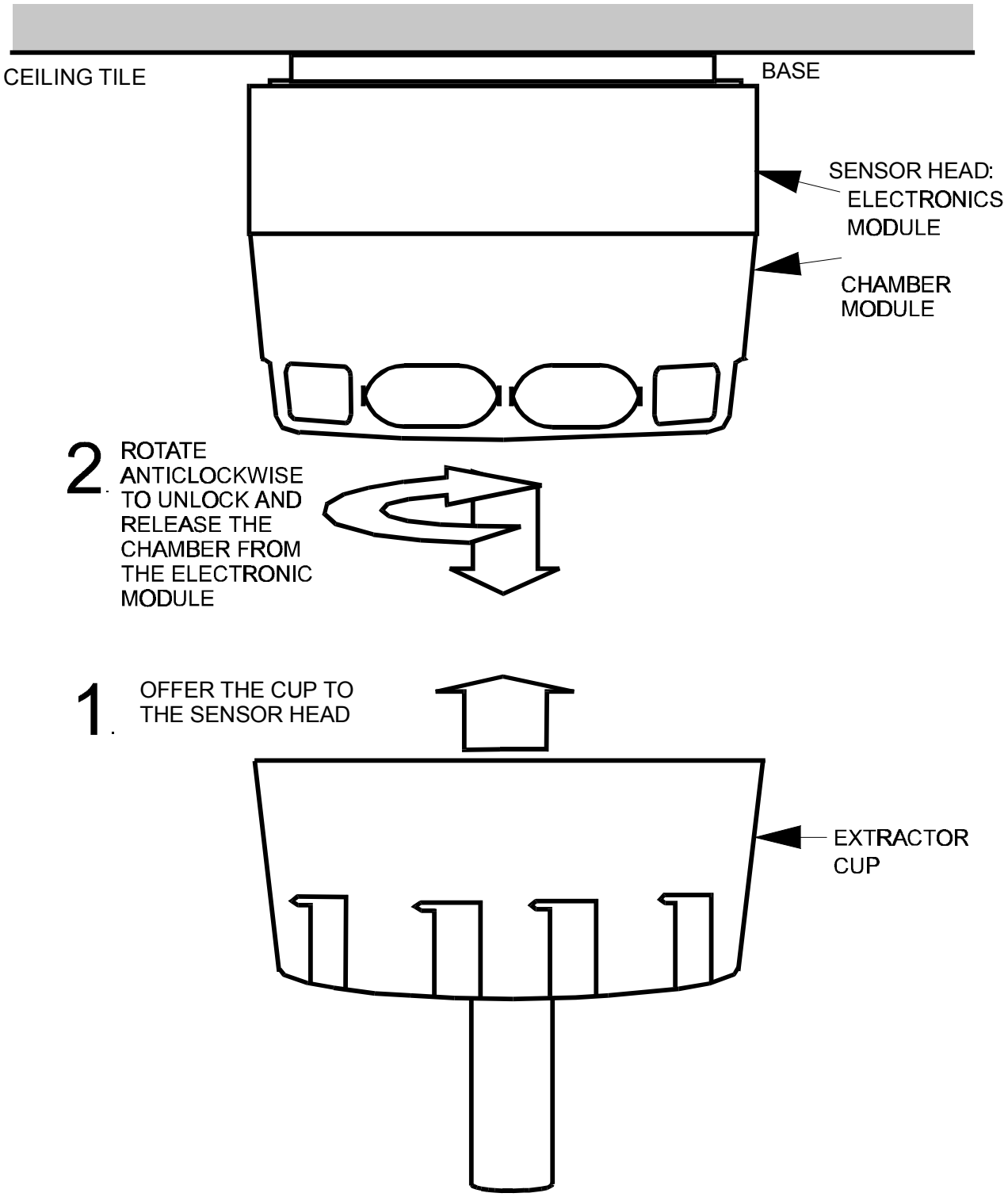



Figure 8-2 Removal of the chamber module

b) Using the **extractor cu**p and appropriate **electronics module removal tool**, remove the electronics module from the terminal plate.

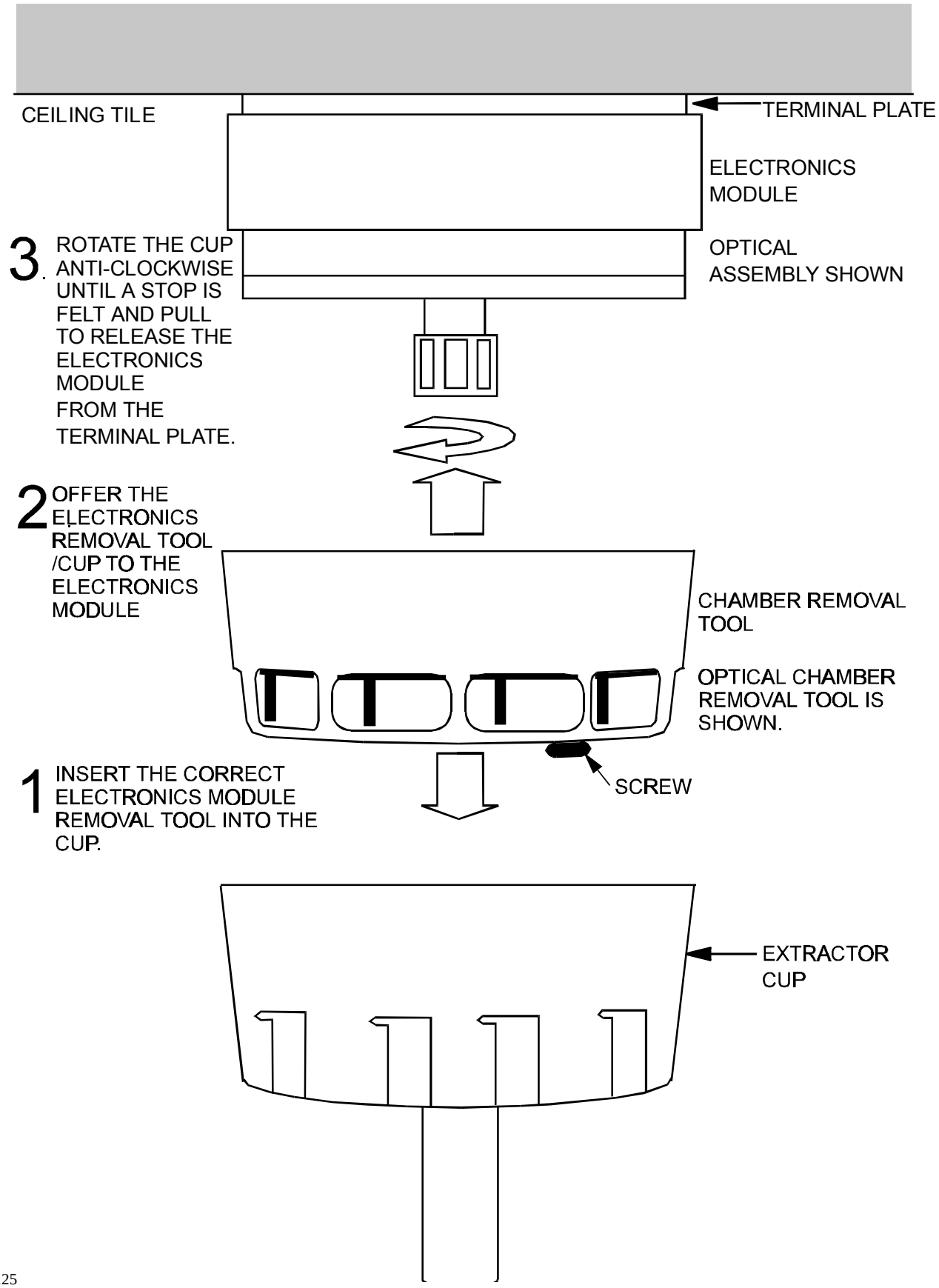
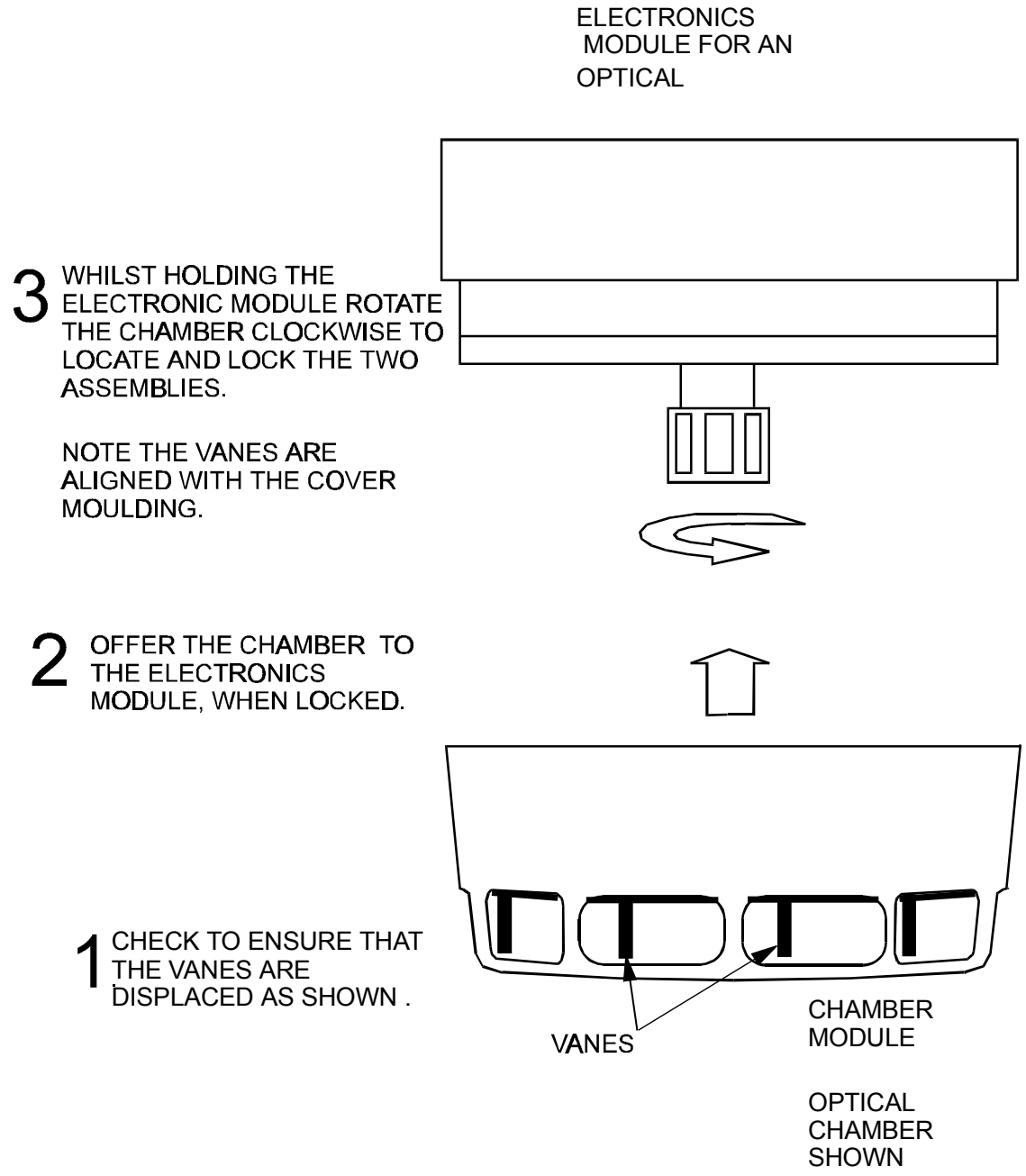

CEILING TILE
TERMINAL PLATE
ELECTRONICS MODULE
OPTICAL ASSEMBLY SHOWN
3. ROTATE THE CUP ANTI-CLOCKWISE UNTIL A STOP IS FELT AND PULL TO RELEASE THE ELECTRONICS MODULE FROM THE TERMINAL PLATE.
2 OFFER THE ELECTRONICS REMOVAL TOOL /CUP TO THE ELECTRONICS MODULE
CHAMBER REMOVAL TOOL
OPTICAL CHAMBER REMOVAL TOOL IS SHOWN.
SCREW
1 INSERT THE CORRECT ELECTRONICS MODULE REMOVAL TOOL INTO THE CUP.
EXTRACTOR CUP
emfl125

Figure 8-3 Removal of electronics from terminal plate

# To assemble a sensor head

Use the following technique when fitting together a chamber to its respective **electronics module** to respective **chamber module**.


ELECTRONICS MODULE FOR AN OPTICAL
3 WHILST HOLDING THE ELECTRONIC MODULE ROTATE THE CHAMBER CLOCKWISE TO LOCATE AND LOCK THE TWO ASSEMBLIES.
NOTE THE VANES ARE ALIGNED WITH THE COVER MOULDING.
2 OFFER THE CHAMBER TO THE ELECTRONICS MODULE, WHEN LOCKED.
1 CHECK TO ENSURE THAT THE VANES ARE DISPLACED AS SHOWN .
VANES
CHAMBER MODULE
OPTICAL CHAMBER SHOWN

emfl127

Figure 8-4 Fitting together chamber and electronics

This page has been intentionally left blank.

# 78260-01NM Semi flush mounting kit

**Where appropriate refer to as fitted wiring diagrams (if supplied), general notes, EMC compliance, cable types and loop circuit connections.**

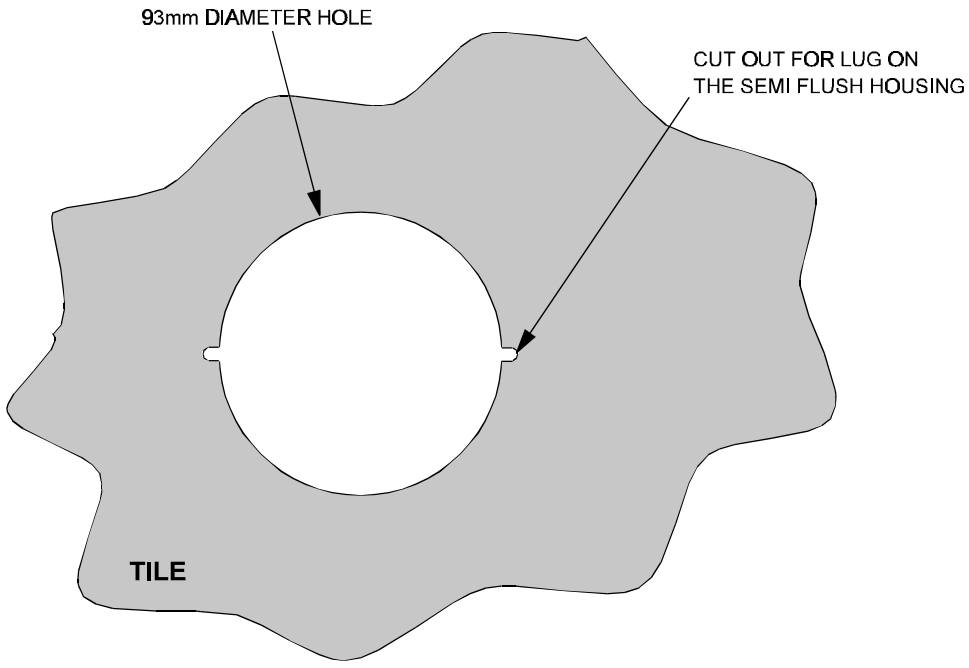
These procedures describe how to semi flush a Senator II fire sensor to a ceiling tile. A 78200-01NM terminal plate and 78260-01NM semi flush mounting kit are required.

a) Identify the package 78260-01NM SENSOR FLUSH MOUNTING KIT and check the contents:

| Component | Quantity |
|---|---|
| Semi flush housing | 1 |
| Flush ring | 1 |
| Clamp | 2 |
| Clamping ring | 1 |
| Locking screws | 2 |

b) Remove the ceiling tile to which the semi flush mounting kit is to be fitted.

c) Cut a hole 93mm diameter in the tile to allow for the lugs on the semi flush housing.




fl115

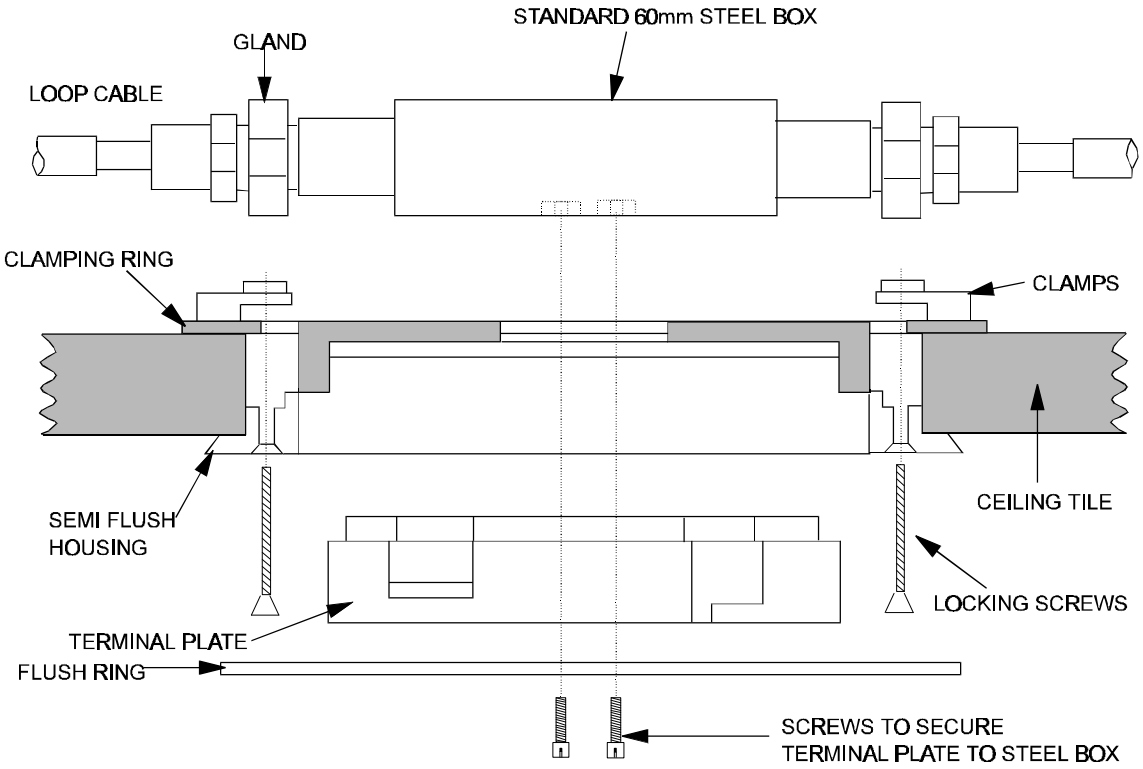
Figure 9-1 Cutouts for lugs

d) Assemble the semi flush housing to the tile using the clamp ring, clamps and locking screws.

e) Replace the tile loosely.

f) Feed the loop wires through the semi flush mounting and terminal plate.

g) Secure the terminal plate to the steel box (BESA box).




fl116

Figure 9-2 Flush kit installation

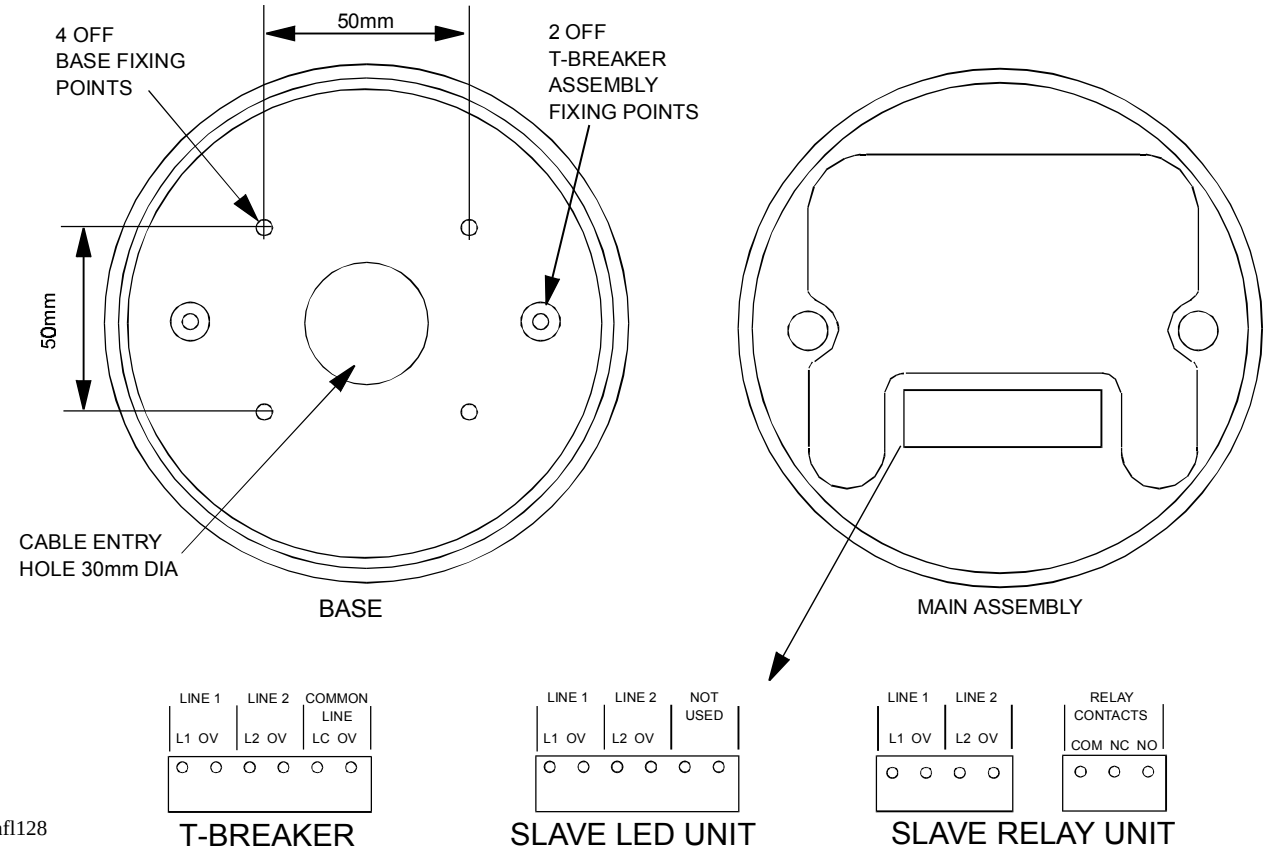
h) Clip the flush ring to the semi flush housing.

> ***CAUTION:*** *Follow the procedure for wiring the terminal plate to prevent damage to the head.*

i) Connect the loop cables to the terminal plate.

# T-breaker and slave units

**Where appropriate refer to as fitted wiring diagrams (if supplied), general notes, EMC compliance, cable types and loop circuit connections.**




shfl128

Figure 10-1 T-breaker and slave units

**78299-01NM T- breaker**

A t-breaker provides a means of making 3-way loop connection to spur circuit.

**78299-02NM Slave LED unit**

A slave LED unit repeats the operation of an LED on an associated fire sensor. The slave is connected on the loop before the associated fire sensor, i.e. towards end 1.

**78299-03NM Slave relay unit**

A slave relay unit operates with the associated fire sensor connected on a loop circuit. The slave is connected on the loop before the associated fire sensor, i.e. towards end 1.

**Installing a unit**

a) Identify the package labelled 78299-01NM T-BREAKER, 78299-02NM SLAVE INDICATOR (LED) UNIT or 78299-03NM SLAVE RELAY UNIT and check the contents:

| Components | Quantity |
|---|---|
| Main assembly | 1 |
| Base | 1 |
| Fixing screws | 2 |

b) Remove the **ceiling tile** to which the **base** is to be fitted.

c) **Punch or drill** the required cable entry and base fixing holes in the tile.

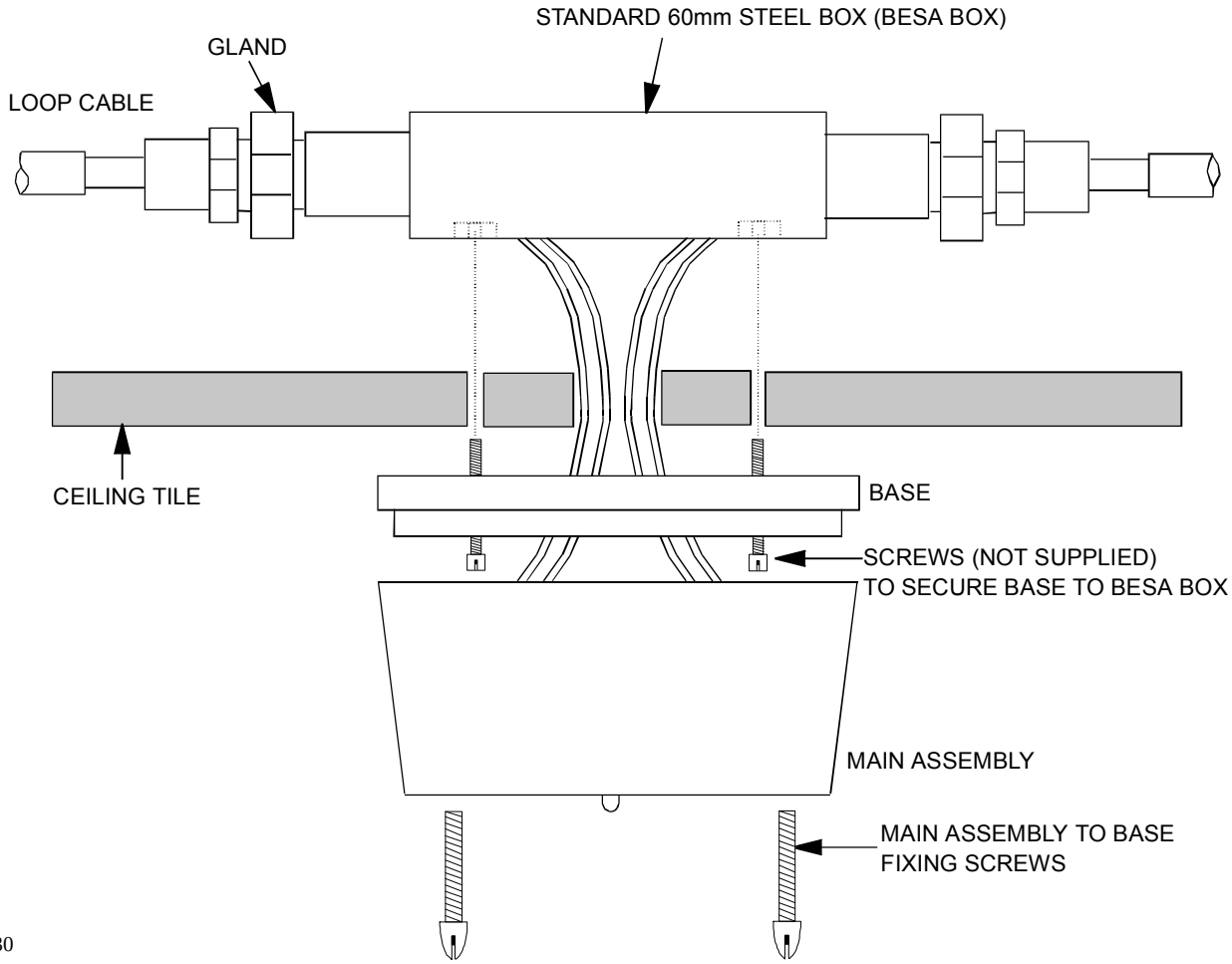



Figure 10-2 Fitting a t-breaker or slave unit

d) Feed the loop wires through the tile and base, and then secure the base to the steel box.

e) Re-fit the ceiling tile.

f) Connect the wires to the terminal block on the **main assembly** and secure the main assembly to the base using screws provided.

# 78260-01NM Duct Sensor

**Where appropriate refer to the as fitted wiring diagrams (if supplied), general notes, EMC compliance, cable types and loop circuit connections.**

The duct sensor consists of a housing assembly and probes for installation on to a ventilation duct.

a) Identify the packages labelled DUCT SENSOR 78260-01NM and PROBES FOR DUCT HOUSING 7908-05 and check that is has the following parts:

| Component | Quantity |
|---|---|
| Duct Housing | 1 |
| Plastic Bungs | 2 |
| Lock Nuts | 2 |
| Inlet Probe | 1 |
| Exhaust Probe | 1 |

b) Mark out the position of the two probe hole centres on the duct.

> ***NOTE:*** *It is important to take into account the direction of the air flow in the duct and probe orientations.*

c) Drill or punch the two probe holes 35mm diameter in the duct.

d) Fit the **lock nut** onto the threaded end of each **probe** and fit the respective probe into its coupling on the **duct housing**. Rotate each probe to face the required direction in the duct and secure the lock nuts to prevent probe from rotating.

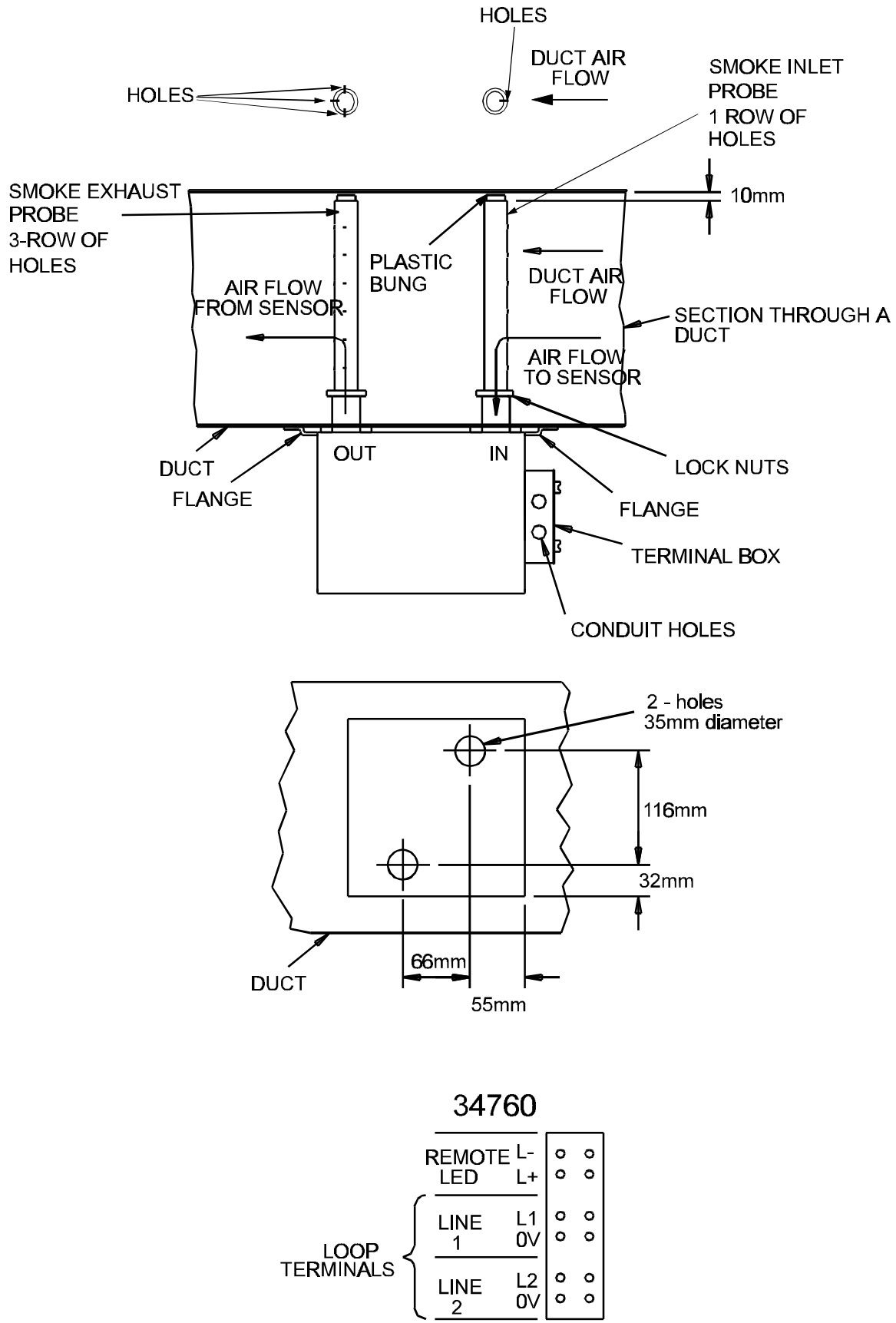
e) Insert the probes into the duct until they reach the opposite wall and measure the gap between the duct housing flange and the duct wall.

f) Remove the probes from the duct and cut the probe ends by the measured gap + 10mm.

g) Fit the **plastic bungs** into the probe ends.

h) Insert the probes into the duct and secure the duct housing using the fixing holes on the flange to provide support to a full assembly weight of 3.3kg.

i) Terminate each cable at the entry and connect the appropriate cable ends to the terminal block.




fl134

Figure 11-1 Duct Sensor fixing and connections

# Manual Call Points

**Where appropriate refer to the as fitted wiring diagrams (if supplied), general notes, EMC compliance, cable types and loop circuit connections.**

## Surface Fixing

a) Identify from a range the required type of manual call point MCP:

| | |
|---|---|
| 78150-52NM | Surface mounted MCP |
| 78155-52NM | Surface mounted MCP keyswitch |
| 78150-55NM | Surface mounted MCP with cover |
| 78150-22NM | Surface mounted water resistant MCP |
| 78150-25NM | Surface mounted water resistant MCP with cover |

Check that it contains the following parts:

| **Component** | **Quantity** |
|---|---|
| Call point Assembly | 1 |
| Back Box | 1 |
| Earth Link | 1 |
| Test Key | 1 |
| Long Screw | 2 |
| Small Screw | 1 |
| Gasket | 1 (Only supplied with 78150-22NM and 78150-25NM) |

b) Cut the required holes on the **back box** for cable entry and also on the **square gasket** if applicable.

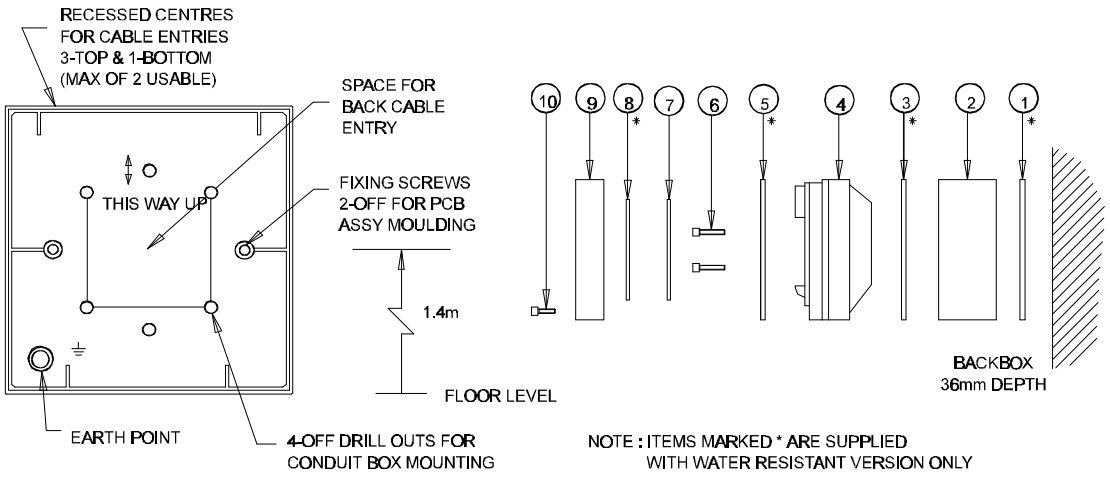
c) Feed the cables through the entry holes and mount the back box with the Square Gasket, if used, to an even wall surface using suitable fixing.

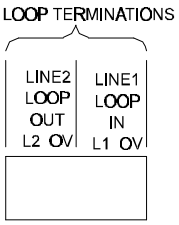
d) Terminate each cable entry at the back box utilising the **earth link** to maintain cable earth continuity.

e) Disassemble the call point assembly using the end of the **test key** to open the socket head screw.

f) Feed the cable tails through the **spacer/back box gasket**, if used and connect the cable ends to the loop terminals provided in the **spacer assembly.**

> ***NOTE:*** *The terminal block used for Loop connection is specifically designed for a single core of 1.5mm² cable only.*




1 – SQUARE GASKET
2 – BACK BOX
3 – SPACER/BACK BOX GASKET
4 – SPACER ASSEMBLY
5 – SPACER/COVER GASKET
6 – LONG SCREWS
7 – GLASS
8 – COVER/GLASS GASKET
9 – COVER
10 – SOCKET HEAD SCREW

fl76

Figure 12-1 Manual Call Point parts

> ***NOTE:*** *Ensure the spacer/back box gasket is fitted on and around the back box profile.*

g) Secure the spacer assembly to the back box using the 2 - long screws.

h) Reassemble the **cover assembly** to the main assembly with the socket head screw. To do this:

i) Fit the spacer/cover gasket, if used.

ii) Insert the glass in a sloping position.

iii) Hang the test key in its operating position.

iv) Place the cover/glass gasket, if used, over the glass with its bevelled edge outwards.

v) Hook the cover onto the main assembly securing the two parts with the allen screw, and remove the test key to leave the call point in its normal operating state.

***NOTE:*** *Check the cover/glass gasket is not trapped around the circular rim of the cover.*

vi) Fit the socket head screw to secure the cover onto the main assembly. A water resistant version is supplied with a longer socket head screw.

# Semi-Flush Fixing

**NOTE:** *When flush fixing the call point, the red plastic back box supplied must be flushed into the wall.*

The procedure for installation is similar to the **surface fixing** version except a MCP 2 SEMI-FLUSH MOUNTING KIT (78150-98NM) , containing a flush plate, must be installed between the back box and spacer assembly.

***NOTE:*** *The water resistant call points 78150-22NM and 78150-25NM* **cannot** *be used for flush fixing.*

# Testing

Push the **test key** through the hole on the underside of the call point to engage the test cam mechanism. Push to operate the cam mechanism. At this point the test key is retained in the call point. Pulling the test key out will reset the glass.

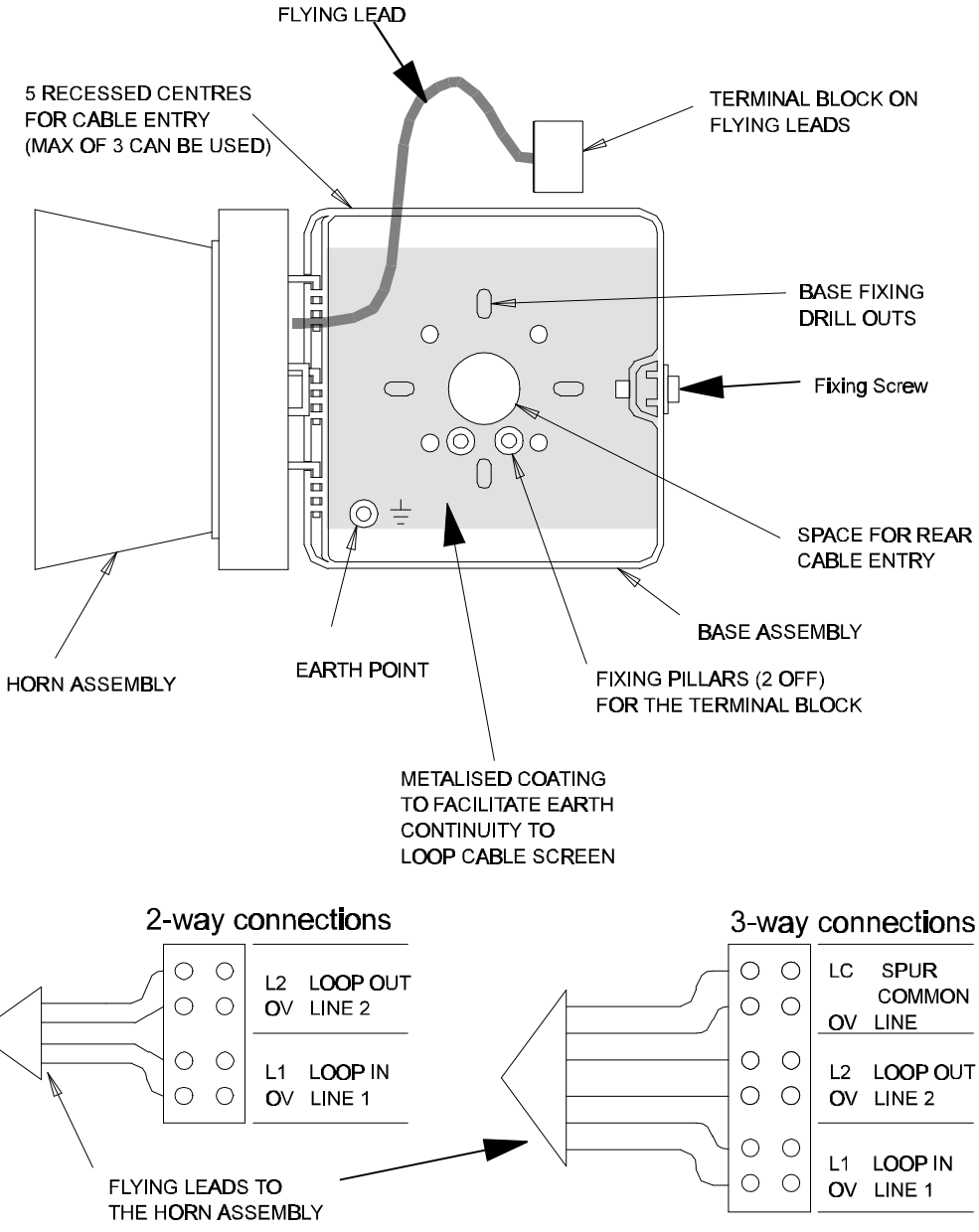
This page has been intentionally left blank.

# Alarm Sounders

**Where appropriate refer to the as fitted wiring diagrams (if supplied), general notes, EMC compliance, cable types and loop circuit connections.**

a) Identify the appropriate package labelled ALARM SOUNDER, there are two types, a 2-way (78400-02NM) or a 3-way (78400-03NM) and check the contents.

| Component | Quantity |
|---|---|
| Horn Assembly | 1 |
| Back Box | 1 |
| Earth Link | 1 (for 2 Way) 2 (for 3 Way) |
| Self Tapping Screw | 2 |
| Allen Key | 1 |




emfl77

Figure 13-1 Alarm Sounder fixing and connections

***NOTE:*** *Use the key supplied to hinge open the* ***horn assembly*** *from the* ***back box.***

b) Cut the required cable entry holes using the recessed centres on the **back box.**

c) Feed the cables through the entry holes and mount the back box to an even surface or BESA box.

***NOTE:*** *The* ***loop cable screen*** *must be electrically connected to the metalised coating in the backbox, either directly via fixing screws or using the earth point, in order to maintain earth continuity.*

d) Terminate the cables at the entry to the back box utilising the **earth links** to provide earth continuity for two cable termination. As an alternative the **earth point** in the back box can be used.

e) Hook the **horn assembly** onto the back box and secure the **terminal block** to the fixing pillars in the back box using the self tapping screws.

f) Connect the cable ends to the terminal block.

g) Close the **horn assembly** onto the **back box** and secure it using the allen key.

# 78277-01NM Repeat Sounder

The 78277-01NM Repeat Sounder is similar to the 78275-01NM Optical Sensor Sounder, but does not include the sensor elements. The installation therefore, is identical to the sensor installation, see section 8.

# 78301-01NM Fire Alarm Interface Unit (Mains powered)

**Where appropriate refer to the as fitted wiring diagrams (if supplied), plus sections in this manual: general notes, EMC compliance, LVD Compliance, cable types and loop circuit connections.**

a) Identify the FIRE ALARM INTERFACE (MAINS POWERED) package numbered 78301-01NM.

## Fuses and locations

| Fuse | Rating | Location |
|---|---|---|
| Mains | 20mm x 5mm 1.6A HRC | Mains terminal block |
| FS1 | 20mm x 5mm 800mA | Pcb |
| FS2 | 20mm x 5mm 800mA | Pcb |
| FS3 | 20mm x 5mm 800mA | Pcb |
| FS4 | 20mm x 5mm 800mA | Pcb |
| FS5 | 20mm x 5mm 2.5A | Pcb |
| FS6 | 20mm x 5mm 800mA | Pcb |

**Interface unit - Pre November 1996**

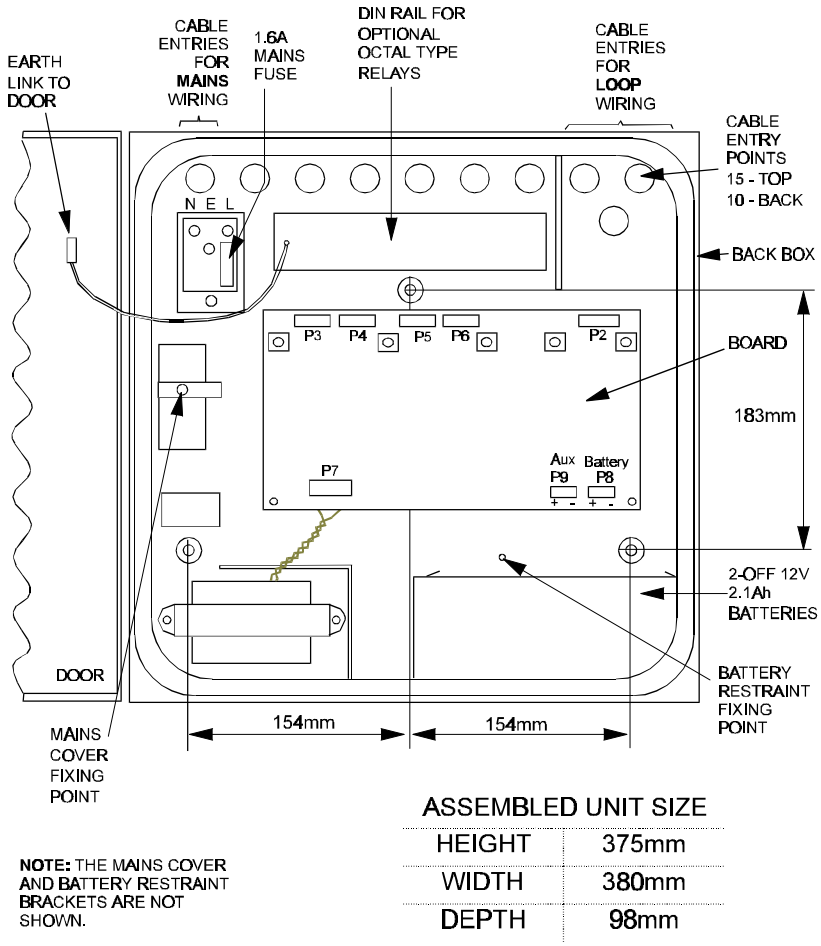
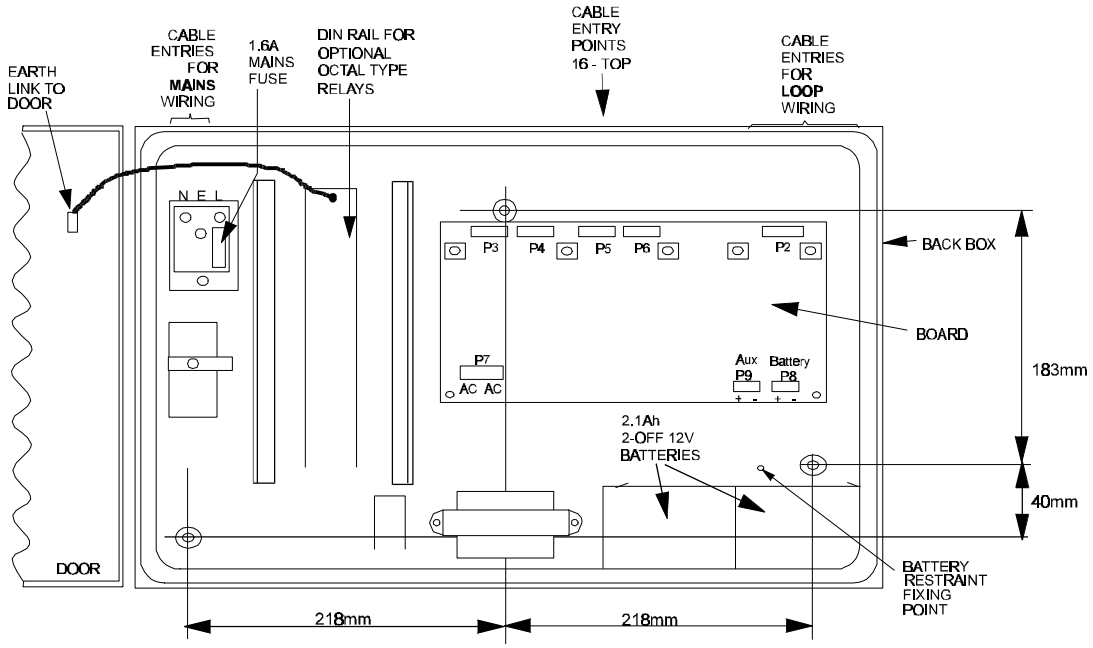



Figure 14-1 Interface Unit with the door open

**Interface unit - Post November 1996**




NOTE: THE BATTERY RESTRAINT BRACKETS ARE NOT SHOWN.

| ASSEMBLED UNIT SIZE | |
|---|---|
| HEIGHT | 305mm |
| WIDTH | 504mm |
| DEPTH | 98mm |

Figure 14-2 Interface unit with the door open

b) Open the door using the **key** and check all components...

| Component | Quantity |
|---|---|
| Unit | 1 |
| Interface Board# | 1 |
| Screws (for board)# | 7 |
| Key | 1 |
| Battery Link | 1 |
| Battery lead | 1 |
| 0.25A Aux Fuse (Spare) | 1 |
| 1.6A Mains Fuse (Spare) | 1 |
| 2.5A Battery Fuse (Spare) | 1 |
| 800mA Quick Blow Fuse (Spare) | 4 |
| Capacitor Unit (EOL) | 4 |
| EOL Label | 5 |
| 22k Resistor (EOL) | 4 |

# these components are packaged separately.

c) If necessary, remove the door on the unit to ease installation.

d) Remove the covers fitted over the **mains terminal**.

e) Knockout the required cable entry points from the back box.

f) Mark the 3 fixing positions on the wall to which the unit is to be mounted.

g) Secure the unit to the wall with suitable fixings to support an approximate full assembly weight of **8.6kg**.

> ***NOTE:*** *If the unit is to switch heavy* ***non-mains loads****, then optional POWER RELAYS 79908-88NM must be used. The relays may be installed on the DIN rail inside the unit. The relay unit must include a serial diode*

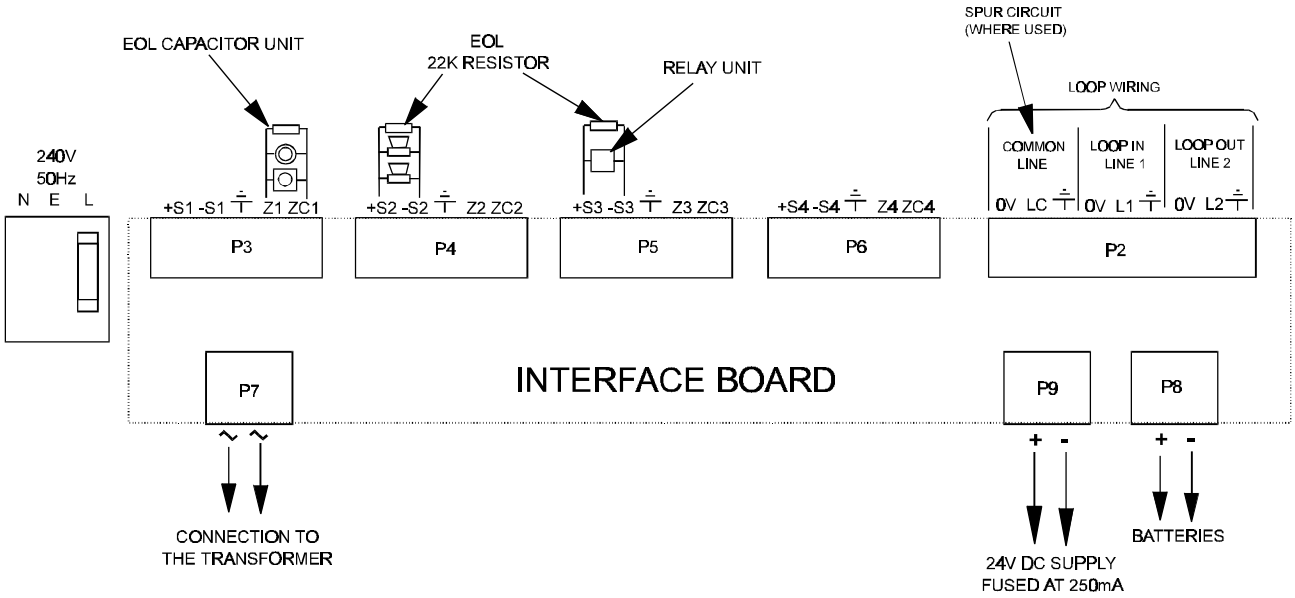
> ***CAUTION: (Pre November 1996)*** *If a mains supply is to be switched by the POWER RELAYS, then the relays must be mounted in a suitable* ***external enclosure*** *for safety reasons. Two enclosures are available, 19100-04 and 19100-02 that can accommodate up to 4 and 2 power relays respectively.*

h) Terminate each cable at the entry point.

i) Fit the **interface board** inside the backbox using the **screws** provided.

j) Connect the incoming cable ends to the appropriate terminals.

k) Connect the transformer secondary wires to terminal block P7 on the interface board.




cdn21

Figure 14-3 Connections Details

l) Place the batteries inside the backbox.

> ***CAUTION:*** *2off 12V @ 2.1Ah Sealed Lead Acid batteries must be used for the network interface.*

m) Fit the covers fitted over the **mains terminal** and **battery restraint bracket**.

n) If removed, re-fit the door and earth lead.

***NOTE:*** *The* ***capacitor unit*** *and the* ***22k Resistor*** *must be fitted to the end-of-line (EOL) of each circuit.*

***NOTE:*** *Stick an* ***EOL label*** *inside the last device on each circuit or where the EOL unit is fitted.*

o) Close the door on the Unit using the Key.

# 78321-01NM Fire alarm interface unit (Loop powered)

**Where appropriate refer to the as fitted wiring diagrams (if supplied), plus sections in this manual: general notes, EMC compliance, LVD compliance, cable types and loop circuit connections.**

## Fuses and Locations

| Fuse | Rating | Location |
|---|---|---|
| FS1 - 4 | 20mm x 5mm 100mA HRC | Pcb |

a) Identify the package labelled FIRE ALARM INTERFACE UNIT (LOOP POWERED) numbered 78321-01NM.

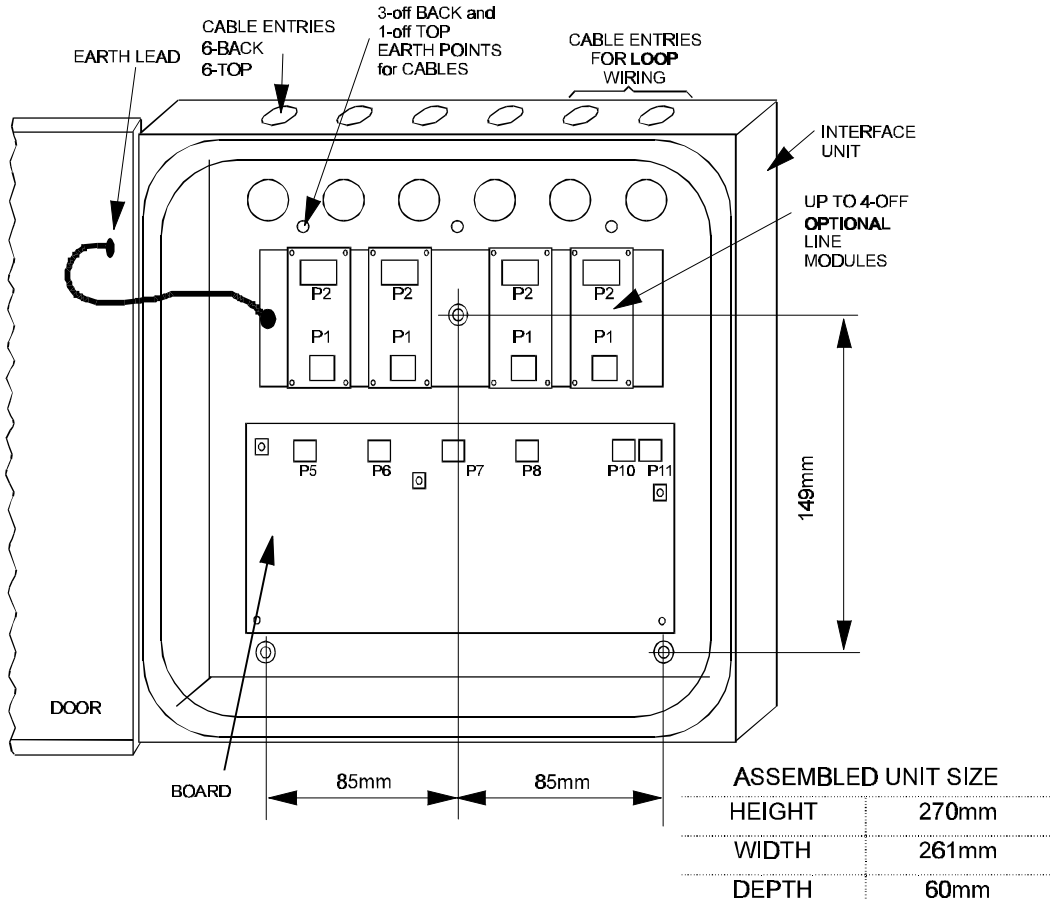



Figure 15-1 Interface unit fixing and connections

fl201

b) Open the door using the **key** and check all components.

| Component | Quantity |
|---|---|
| Unit | 1 |
| Interface board# | 1 |
| Screws (for board)# | 5 |
| Key | 1 |

#these components are packaged separately

c) Knockout the required cable entry points.

> ***NOTE:*** *Mount the unit with cable entry points at the top.*

d) Mark and drill the **three** hole fixing positions on the surface to which the unit is to be mounted.

e) Secure the unit to the surface with suitable fixings to support a fully assembled weight of **2.4Kg.**

f) Terminate each cable at the entry point.

g) Fit the **interface board** using the screws provided.

h) Fit the **line modules** inside the backbox, if required.

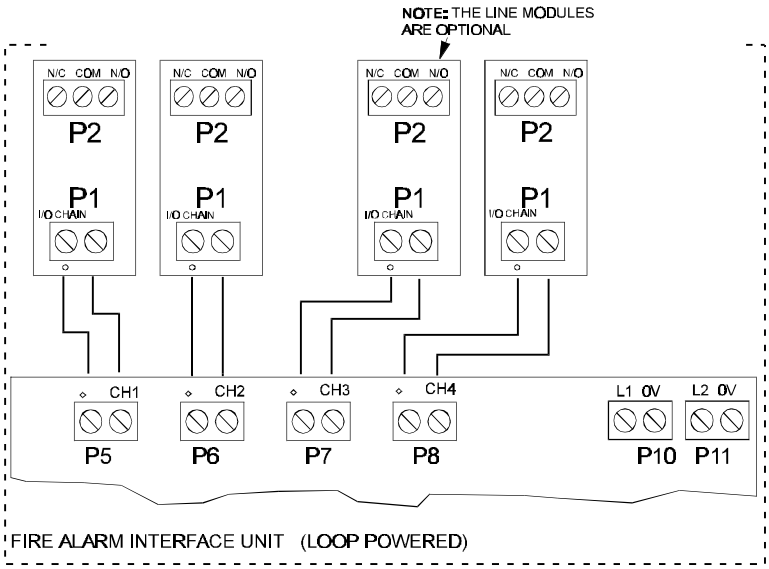



Figure 15-2 Line module internal connection details

fl202

i) Connect the appropriate cables ends to their terminals.

> ***CAUTION:*** *It is important to keep cables away from the* ***locking mechanism*** *on the door.*

> ***NOTE:*** *A remotely installed line module should not be located more than* ***100m*** *cable distance away form the interface unit, assuming* ***1.5mm²*** ***MICC*** *is being used. An overall limit of* ***1Km*** *of line module monitoring cable per loop is allowed.*

j) Close the door on the unit using the key.

# 78345-06NM Power Supply Unit

**Where appropriate, refer to the as fitted wiring diagrams (if supplied), plus sections of this manual: general notes, EMC compliance, LVD compliance, cable types and loop circuit connections.**

## Fuses and Locations

| Fuse | Rating | Location |
|---|---|---|
| Mains | 20mm x 5mm 1A HRC | Mains terminal block |

a) Identify the package labelled SUPPLY UNIT numbered 78345-06NM.

b) Using the **key** open the door and check its condition of the unit.

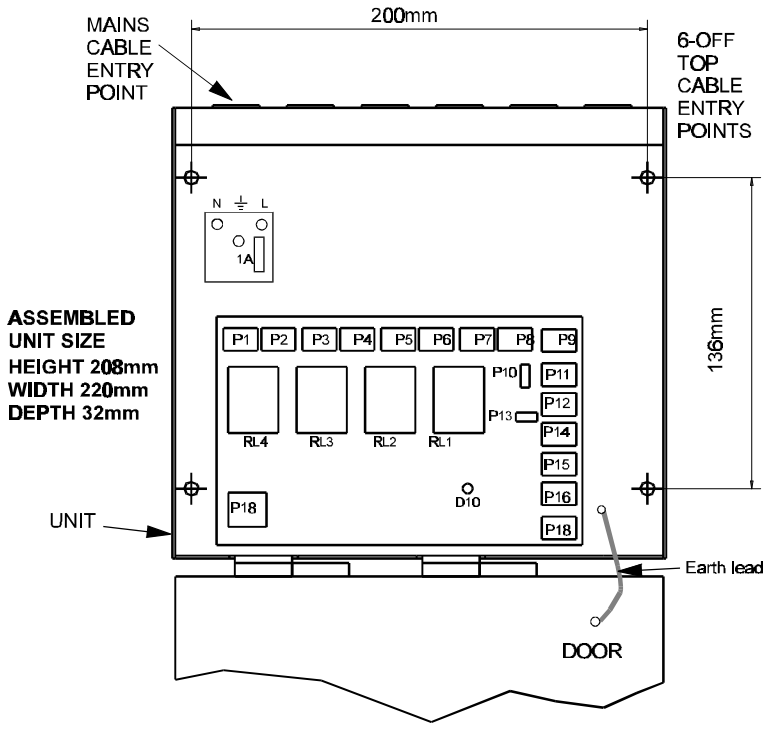


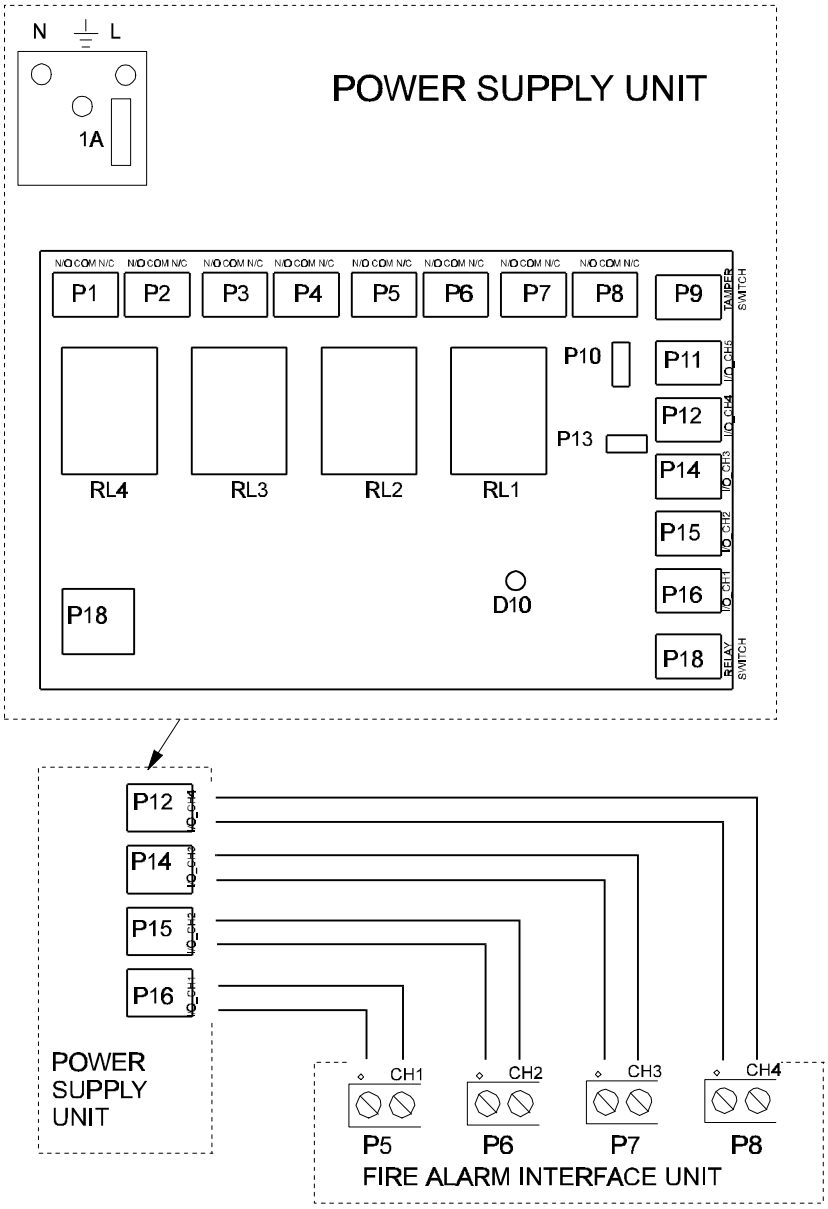

Figure 16-1 Supply Unit fixing details

fl203

c) Knockout the required cable entry points (6-off on top of case).

> ***NOTE:*** *The unit must be mounted with the cable entry points at the top of the unit.*

d) Mark and drill the four fixing hole positions on the surface to which the unit is to be mounted.




cdn19

Figure 16-2 PSU to interface unit connections

e) Secure the unit to the surface with suitable fixings to support a fully assembled weight of **1.5Kg.**

g) Terminate cables at the entry points.

g) Connect the cables ends if instructed, otherwise leave tail wire length of **400mm** and mark the cores to identify the connection point.

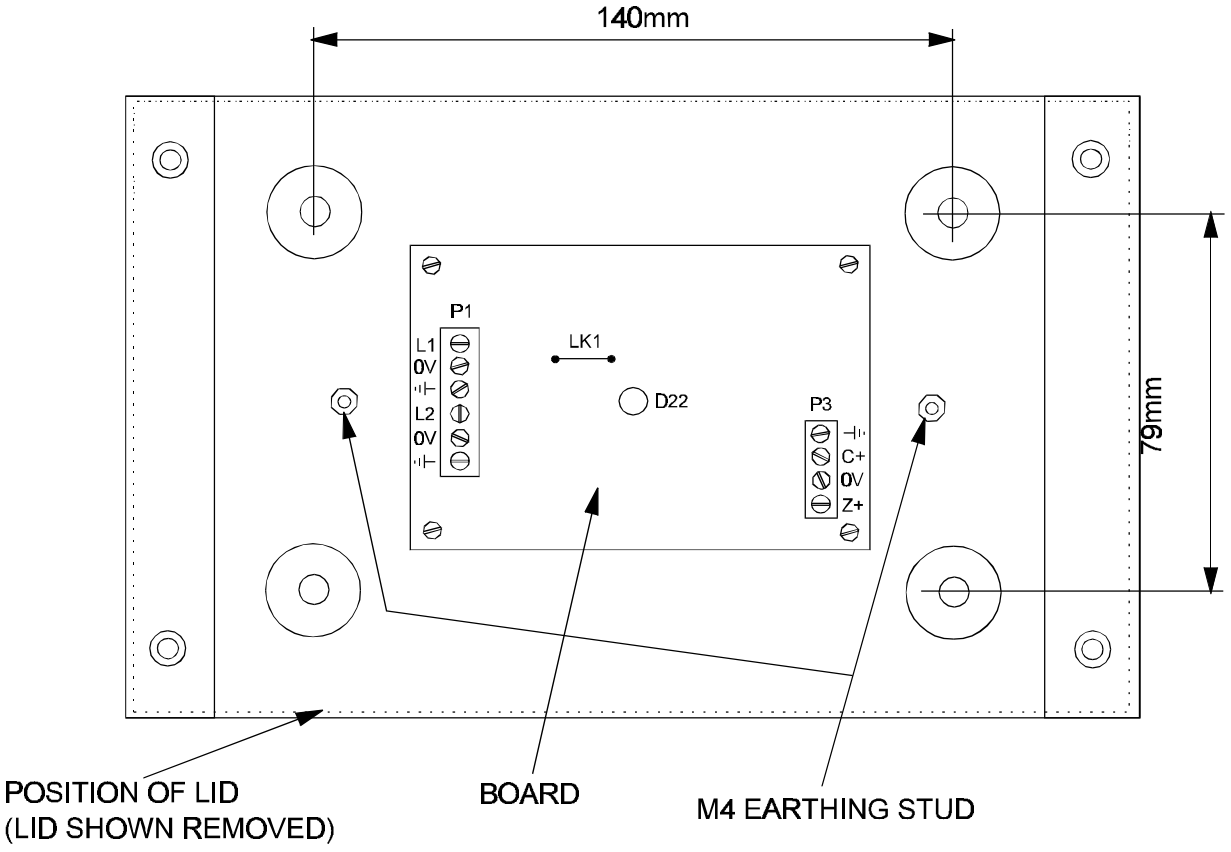
h) Close the door on the unit using the key.

> ***NOTE:*** *The unit is supplied complete with 1 PSU RELAY. The unit is designed to operate a maximum of 4 relays. Individual PSU RELAYs may be ordered using part code 78345-88NM.*

# 78310-01NM Loop Powered Zone Module

## (Not available at time of issue)

**Where appropriate refer to the as fitted wiring drawings (if supplied), notes to installer, EMC compliance, LVD compliance, cable types and loop circuit connections.**




fl345

Figure 17-1 Loop powered zone module with lid removed

a) Identify the LOOP POWERED ZONE MODULE package numbered 78310-01NM.

b) Remove the lid to the module.

c) Remove all packages from inside the module.

d) Knockout the required cable entry points from the module sides.

e) Mark the four fixing positions on the wall to which the unit is to be mounted.

f) Secure the unit to the wall with suitable fixings to support an approximate full assembly weight of TBDkg.

g) Fit the pcb into the module using the fixings provided.

h) Connect the appropriate cable ends to the appropriate terminals.

i) Secure the lid to the module.

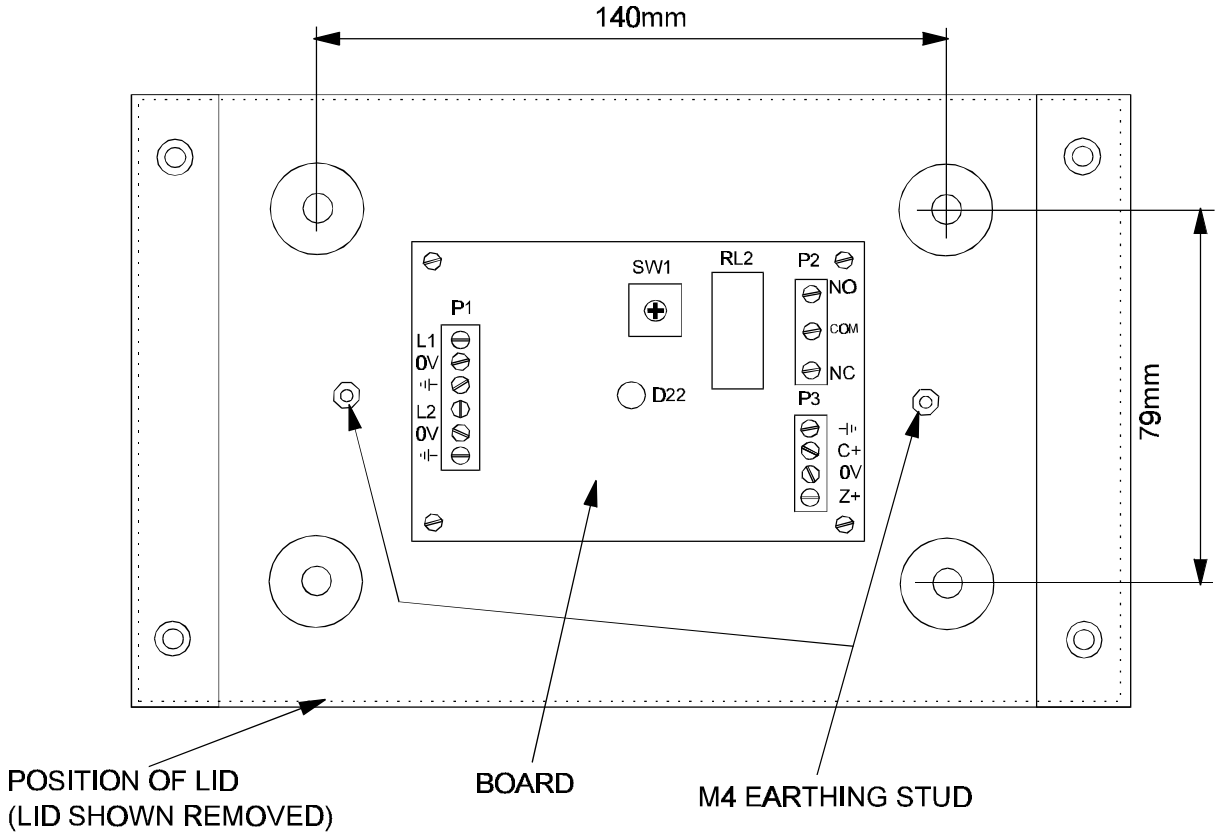
j) Leave all outstanding installation work until the commissioning stages.

# 78315-01NM Single Channel Interface (Loop Powered)

## (Not available at time of issue)

**Where appropriate refer to the as fitted wiring drawings (if supplied), notes to installer, EMC compliance, LVD compliance, cable types and loop circuit connections.**

a) Identify the SINGLE CHANNEL INTERFACE (LOOP POWERED) package numbered 78315-01NM.




fl346

Figure 18-1 Single Channei Interface (lid removed)

b) Remove the lid to the module.

c) Remove all packages from inside the module.

d) Knockout the required cable entry points from the module sides.

e) Mark the four fixing positions on the wall to which the unit is to be mounted.

f) Secure the unit to the wall with suitable fixings to support an approximate full assembly weight of TBDkg.

g) Fit the pcb into the module using the fixings provided.

h) Connect the appropriate cable ends to the respective terminals.

i) Secure the lid to the module.

j) Leave all outstanding installation work until the commissioning stages.

# Network Overview

This section gives an overview of the Senator II Network. It shows the connections between Senator II Control Panels and Network Interfaces.

## Network Capacity

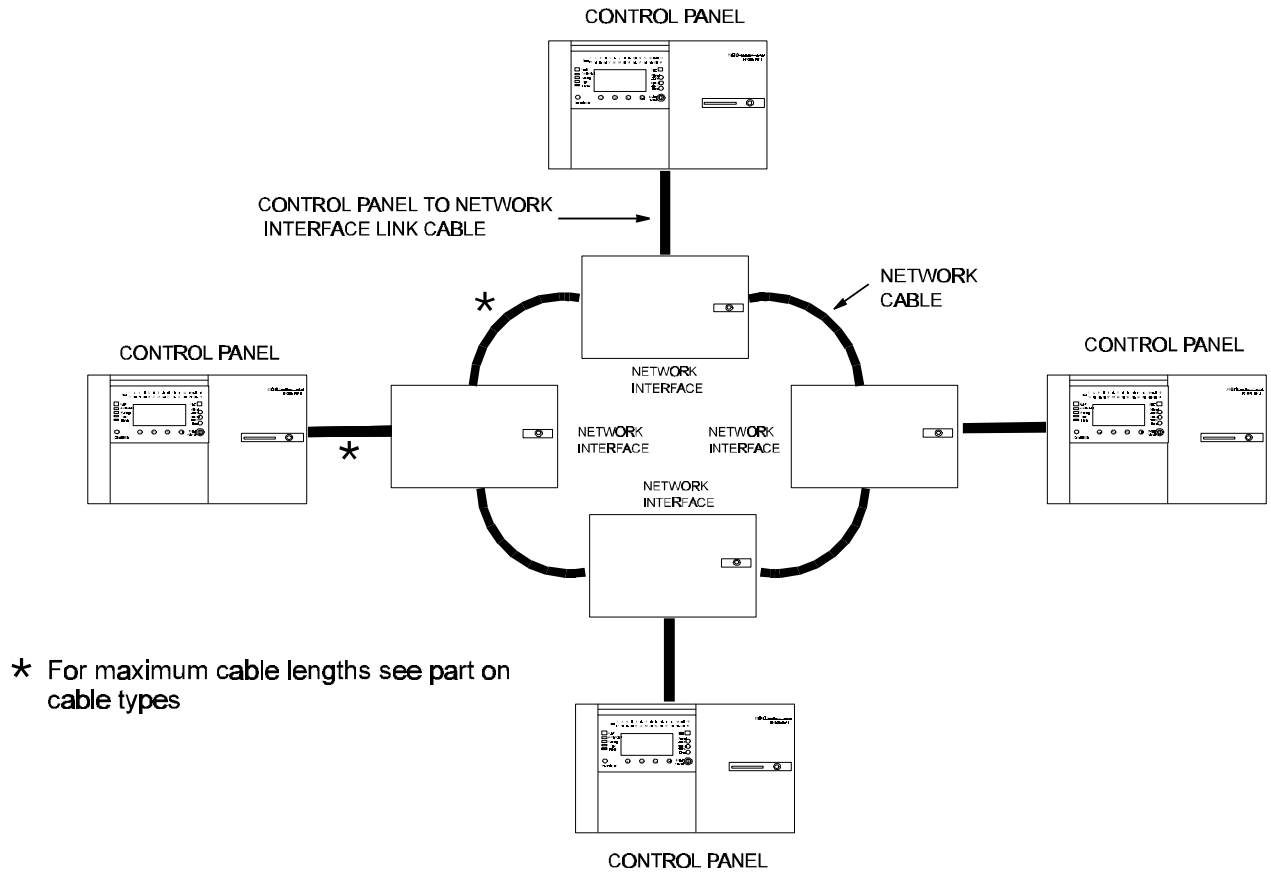
A network can connect a maximum of **16 control panels**.

Each **control panel** will have a **network interface**. The network interfaces are connected together to form a 'loop'.

## Network Cables

See the part on Network Cables

## Schematic Diagram




cdn22

Figure 19-1 Senator II Network Schematic

This page has been intentionally left blank

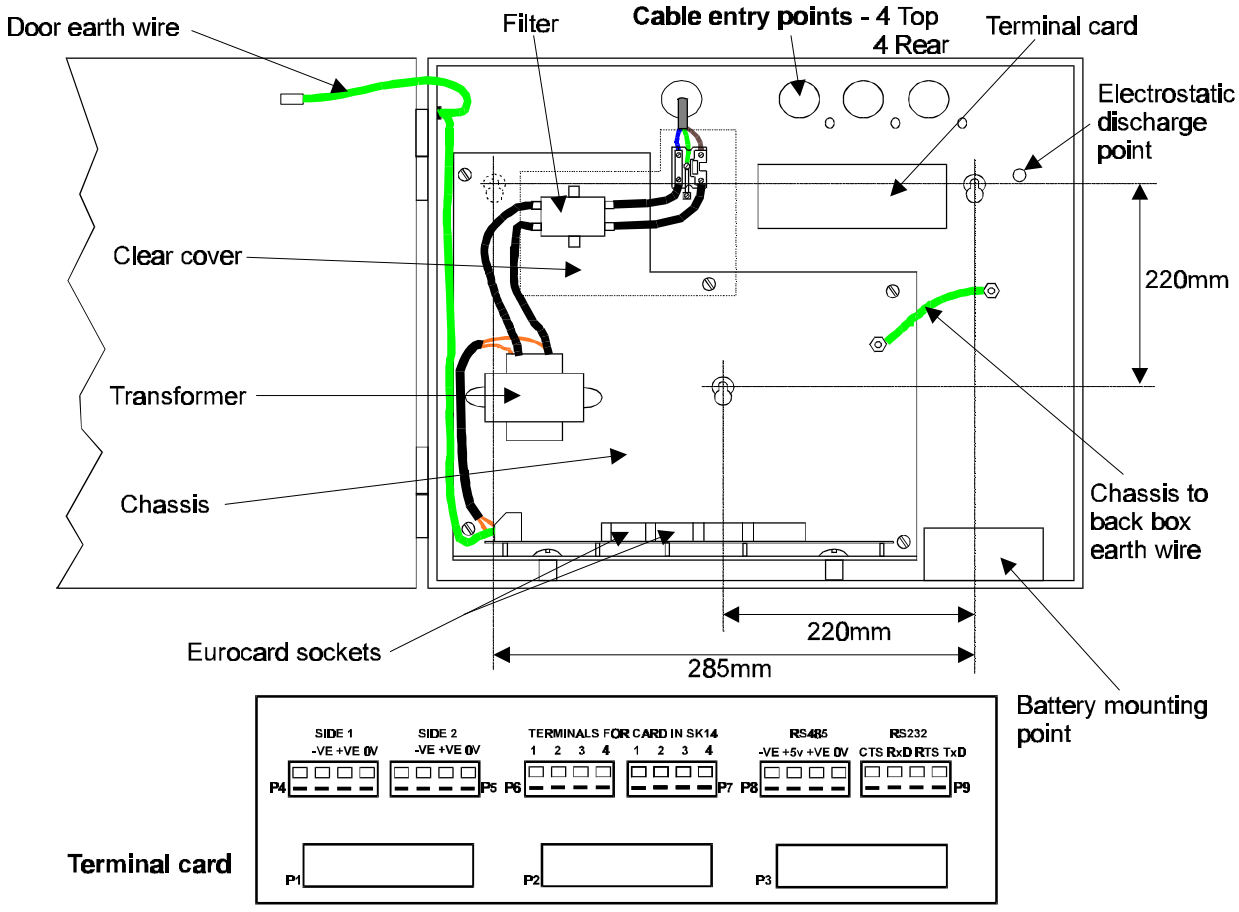
# Network Installation

**Where appropriate, refer to the as fitted wiring diagrams (if supplied), general notes, EMC compliance, LVD compliance, cable types and network overview.**

## Fuses and Locations

| Fuse | Rating | Location |
|---|---|---|
| Mains | 20mm x 5mm 1A HRC | Mains terminal block |
| FS1 | 20mm x 5mm 2.5A | Backplane |

## 78520-01NM Network Interface




cdn8

Figure 20-1 Network Interface Fixing and Connections

***CAUTION:*** *1off 12V @ 7.0Ah Sealed Lead Acid battery must be used for the network interface.*

a) Identify the NETWORK INTERFACE package number 78520-01NM and check that it has the following components:

| Component | Quantity |
|---|---|
| Network Interface | 1 |
| Door key | 1 |
| Enable Controls key | 1 |
| Fuse 1A | 1 |

b) Open the interface door using the door key.

c) Remove the back box to door earth lead. Also remove the back box to chassis plate earth lead.

d) Remove the door from the back box assembly, by sliding it up and off.

e) Remove the mains terminal cover by removing the screws.

f) Disconnect the 3 ribbon cables from the terminal PCB.

Also disconnect the spade terminals between the mains terminal block and the mains filter.

g) Remove the chassis plate by removing 5 screws then sliding it up and off.

h) Knock out the required cable entry points from the back box.

i) Mark out the back box fixing points on the wall to which the panel is to be mounted.

j) Secure the back box to the wall with suitable fixings to provide adequate support for a full assembly weight of **11 Kg**.

k) Terminate each cable at the entry point leaving **400mm** tail wire length and mark each core to identify its intended connection point.

> ***WARNING:*** *The mains cable tail ends must be insulated to prevent dangerous conditions arising in the event of accidental switching on of the mains supply.*

l) Re-fit the chassis plate by hooking the keyholes onto the support pillars and secure to the back box by re-fitting the 5 screws.

m) Connect the three ribbon cables to the terminal PCB and the two spade terminals to the mains filter.

n) Re-fit the mains terminal cover using the fixing screws.

o) Slide the door to the back box assembly, ensure the door can open and close easily.

p) Fit the back box to door earth lead, and the back box to chassis plate earth lead.

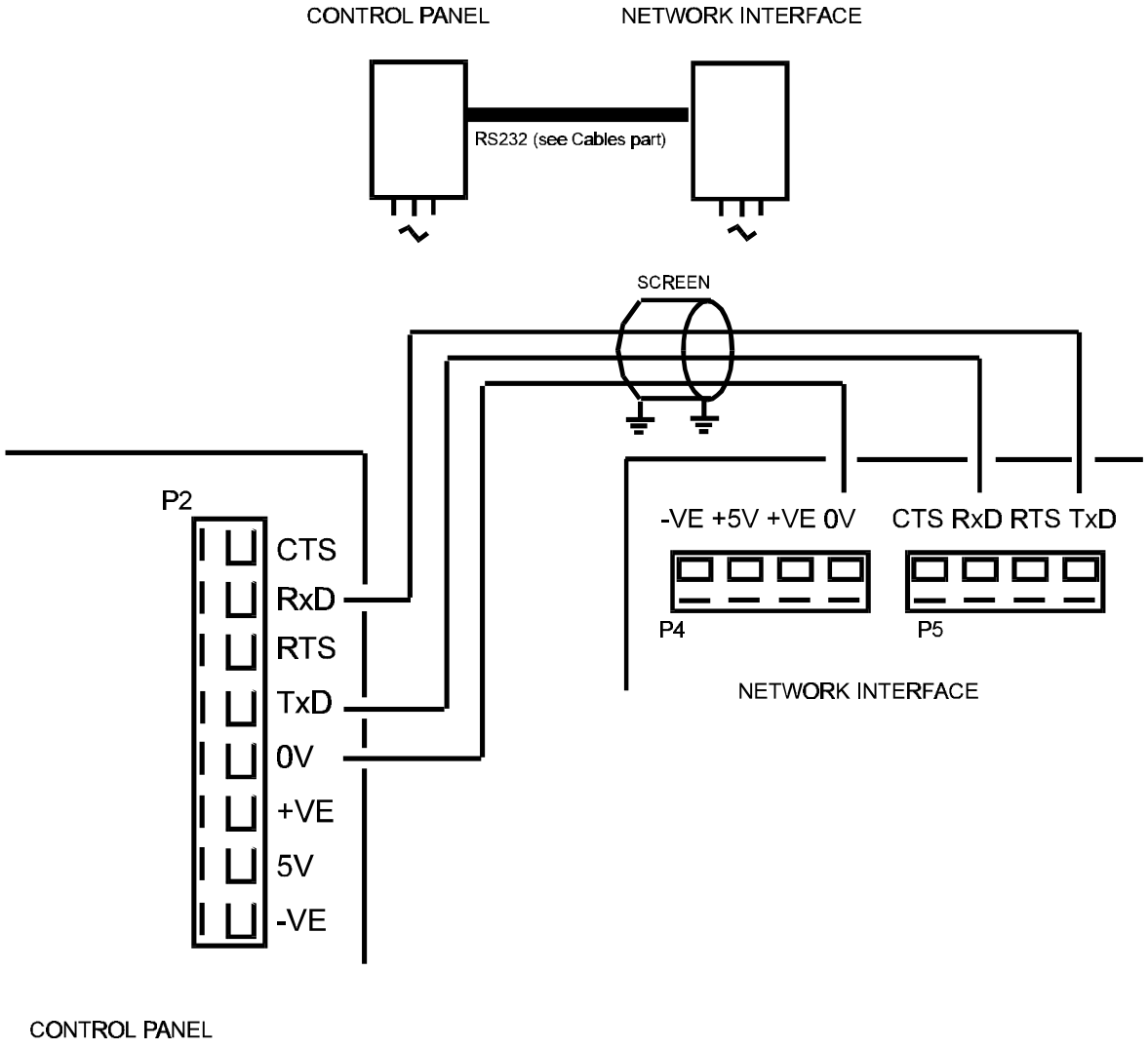
q) Ensure all cables are secured to the base of the back box.

r) Close the door and lock it using the door key. All remaining installation is done during commissioning of the system.

This page left intentionally blank.

# Network Wiring

## 78500 Control Panel to 78520 Network Interface

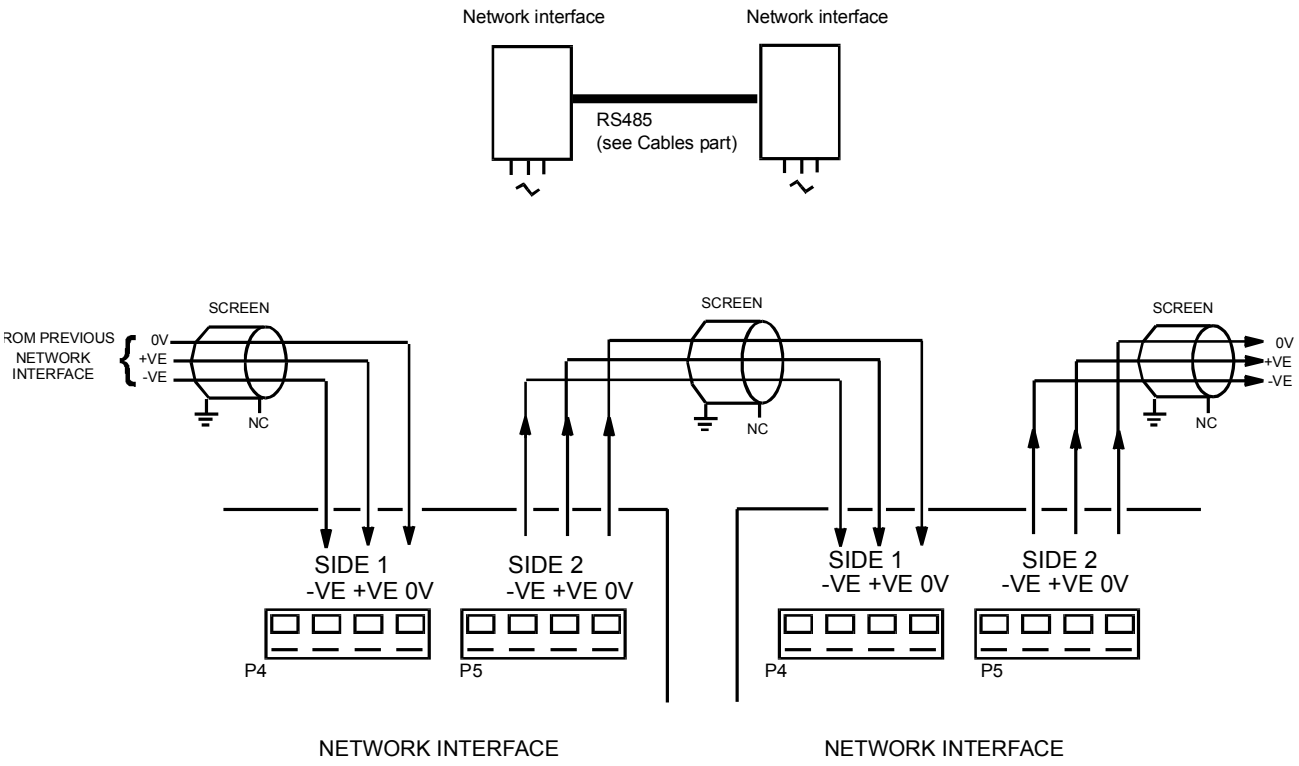



cdn15

Figure 21-1 Control Panel to Network Interface

> ***Note:*** *If a cable is a twin twisted pair, make sure when connecting the equipment that one pair is used for -VE and +VE and the other is used for the OV (only one core connected to the OV, the other is not connected.)*

# 78520 Network Interface to 78520 Network Interface




gsmfl5

Figure 21-2 Network Interface to Network Interface

***Note:*** *One end only of the screen is connected to earth, the other is not connected (N/C).*

***Note:*** *If a cable is a twin twisted pair, make sure when connecting the equipment that one pair is used for -VE and +VE and the other is used for the OV (only one core connected to the OV, the other is not connected.)*

# Senator II

## Introduction

This section lists the commercially available parts for use in the Senator II system.

## Control and indicating equipment

**Control Panel** * - first fix products

| | |
|---|---|
| 78500-02NM | Fire alarm Control Panel SET including control panel, 1 loop card, power supply and battery box. |
| *78500-82NM | Fire alarm Control Panel |
| 78534-82NM | Control panel Power supply unit |
| *78510-02NM | Control Panel Battery Box |
| 78390-01NM | Printer paper |

**NOTE:** *Battery pack 4-off (minimum) 12V 12Ah required but not supplied.*

**Network**

| | |
|---|---|
| 78520-01NM | Network Interface |

**NOTE:** *Battery pack 1-off 12V 7Ah required but not supplied.*

**Repeat Panel**

| | |
|---|---|
| 78600-01NM | Fire alarm Repeat Panel SET |
| 78600-82NM | Fire alarm Repeat Panel |

**NOTE:** *Battery pack 2-off 12V 7Ah required but not supplied.*

**Flush Shrouds**

| | |
|---|---|
| 78500-29NM | Flush shroud for 78500 Control Panel |
| 78600-29NM | Flush shroud for 78600 Repeat Panel |
| 78510-29NM | Combined Flush shroud for 78500 Control panel and 78510 Battery box |

# Cards

| | | |
|---|---|---|
| **78500 Control panel** | 78530-03NM | Local controller card V3, (LCC for 78500) |
| | 78540-03NM | Loop processor card V3, (LPC for 78500) |
| | 78560-03NM | 1-2 Loop panel RAM Card, (for 78500) |
| | 4094-101 | LCC dongle |
| | 78550-03NM | I/O card V3, (for 78500) |
| **78520 Network Interface** | 13501-01 | Network card |
| | 13530-11V3+ | Local controller card |
| | 32023-21 | I/O card |
| | 32024-01 | I/O switch enable module |

# Sensors, terminal plate and Accessories

| | | |
|---|---|---|
| **Sensors** | 78215-01NM | Optical sensor |
| | 78215-11NM | Replacement chamber for Optical sensor |
| | 78275-01NM | Optical sensor sounder |
| | 78215-11NM | Replacement chamber for Optical sensor sounder (as for Optical Sensor) |
| | 78220-01NM | Heat sensor |
| | 78220-11NM | Replacement chamber for Heat sensor |
| | 78230-01NM | Ionisation smoke sensor |
| | 78230-11NM | Replacement chamber for Ionisation smoke sensor |
| | 78285-01NM | Heat sounder |
| | 78285-11NM | Heat sounder chamber |
| | 07012-31 | Flame detector (conventional type) |
| | 07700-21 | Base for conventional flame detector |
| **Special sensors** | 78260-01NM | Duct Sensor |
| **Terminal Plate** | 78200-01NM | Terminal plate |
| | 78261-01NM | Sensor semi-flush mounting kit |

| | | |
|---|---|---|
| **Slaves/ T-Breaker** | 78299-01NM | T-breaker Unit |
| | 78299-02NM | Slave LED unit (Remote Fire lndicator Unit) |
| | 78299-03NM | Slave Relay Unit |
| **Tools** | 78290-05NM | Sensor Tool Kit |
| | 78290-01NM | Sensor Extractor cup |
| | 78290-02NM | Electronics module removal tool - Optical |
| | 78290-03NM | Electronics module removal tool - Ionisation |
| | 78290-04NM | Electronics module removal tool - Heat |

# Alarm sounders

| | | |
|---|---|---|
| **Sounders** | 78400-02NM | Alarm sounder 2-way |
| | 78400-03NM | Alarm sounder 3-way |
| **Repeat Sounder** | 78277-01NM | Repeat Sounder |

# Manual call points (MCP)

| | | |
|---|---|---|
| **MCPs** | 78150-52NM | Surface mounted MCP |
| | 78155-52NM | Surface mounted MCP keyswitch |
| | 78150-55NM | Surface mounted MCP with cover |
| | 78150-22NM | Surface mounted water resistant MCP |
| | 78150-25NM | Surface mounted water resistant MCP with cover |
| | 78150-98NM | MCP Semi-flush mounting kit |
| **Spares** | 78150-91NM | Spare glasses (Pack of 10) |

# Interfaces

| | | |
|---|---|---|
| **Mains Powered Interface** | 78301-01NM | Fire Alarm Interface unit - Mains powered |
| | 78301-11NM | Card for mains powered interface |
| | 79908-88NM | Power relay for Fire Alarm Interface - Mains powered complete with base and diode pack. ( up to a maximum of 4 can be used) |

| | | |
|---|---|---|
| **4-channel Loop Powered Interface** | 78321-01NM | Fire Alarm Interface unit - Loop powered |
| | 78321-11NM | Card for loop powered interface |
| | 78345-05NM | Interface line module (up to 4 can be installed in a 78321-01) |
| | 78345-06NM | Power supply unit for Fire Alarm Interface - Loop powered (including 1 mains relay) |
| | 78345-88NM | Mains relay (up to 4 used with PSU) |
| **1-channel Loop Powered Interface** | #78310-01NM | Loop powered zone module |
| | #78315-01NM | Single channel interface (loop powered) |

# Manuals & Accessories

| | |
|---|---|
| 78910-03NM | Senator II Installation Instructions |
| 78930-03NM | Senator II Operating manual |
| 78920-03NM | Senator II Commissioning manual |
| 78900-03NM | Senator II Applications manual |

# not available at time of issue